ENERGY STAR® Program Requirements for CFLs
Partner Commitments

Eligible Organizations:
Manufacturers and Distributors of Compact Fluorescent Lamps (CFLs)

Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing and/or distributing of ENERGY STAR qualified CFLs. The ENERGY STAR PARTNER (PARTNER) must adhere to the following program requirements:

- Comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on product packaging and the testing criteria for CFLs. DOE, at its discretion may conduct tests on products that are referred to as ENERGY STAR qualified through the third party testing portion of the criteria. These products will be obtained on the open retail or commercial distribution market;

- Comply with current ENERGY STAR Identity Guidelines. The Guidelines describe how the ENERGY STAR marks and name must be used. PARTNER is responsible for adhering to these guidelines and for ensuring that all its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;

- Qualify, or private label at least one ENERGY STAR qualified CFL model within one year of activating the CFL portion of the agreement. When PARTNER qualifies the product, it must meet the criteria in effect at that time;

- Provide clear and consistent labeling of ENERGY STAR qualified CFLs. The ENERGY STAR certification mark must be clearly displayed on the front of the qualified product packaging, on the PARTNER'S Internet web site where information about its ENERGY STAR qualified models is displayed, and in qualified product literature (e.g., catalogs, user manuals, spec sheets, etc.);

- Provide to DOE, or its ENERGY STAR CFL program contractor, on an ongoing basis, an updated list of its ENERGY STAR qualifying CFL models. PARTNER'S must inform the ENERGY STAR CFL program contractor, in these updates if any existing qualified CFL models have updated test data or reports, revised model numbers and/or retail product numbers, or will be discontinued or phased out and the timing of such. PARTNER will provide these ongoing updates in order to remain on the list of participating ENERGY STAR CFL PARTNERS;

- Notify the ENERGY STAR CFL program contractor, within 30 days, if the designated supplier of any qualified private labeled CFLs changes to a new supplier. The PARTNER is required to submit, in writing, an updated Private Labeler Qualification Form that identifies the new original equipment manufacturer, specific model, and other packaging information;

- For each qualifying CFL model, provide to DOE accredited laboratory test data reports for the specific model(s) to certify that the lamp(s) have met the required safety and performance tests criteria;

- For each qualifying CFL model, provide to the ENERGY STAR CFL program contractor product packaging samples (either electronic or hard copy for the specific model(s)) to meet the criteria packaging requirements. Products will only be added to the ENERGY STAR Qualified Product List and search after review and approval of the product test results and product packaging;

- PARTNER is responsible for all associated financial costs if their products are selected for testing within the Third Party Testing and Verification program. ENERGY STAR requires PARTNERS' participation in the Third Party Testing and Verification System and will remove PARTNERS from the program if they do not participate in the program.

- Provide to the ENERGY STAR CFL program contractor to DOE, on a bi-annual basis, unit shipment data for ENERGY STAR qualified CFLs. Specifically, PARTNER must submit the total number of ENERGY STAR qualified CFLs shipped in units by model type/designs, wattage, and if possible, model or product number. The model type/designs are grouped in the following categories:

    - Bare: mini-spiral, spiral, 2-D, circline, twin-tube, triple-tube, quad-tube

- Covered: A-shaped, bullet, candle, post
- Globes: G-25, G-30, G-40
- Reflectors: R-20, R-30, R-40, PAR38

PARTNER is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by total unit shipments for each model in its product line and percent of total unit shipments that qualify as ENERGY STAR.

The data for each half of the calendar year should be submitted to the ENERGY STAR CFL program contractor, in an electronic spreadsheet format (Microsoft Excel) that is provided by ENERGY STAR, no later than **February 15th** (for July-December) and **August 15th** (for January-June), and may be provided directly from the PARTNER or through a third party that works directly with the PARTNER.

- Notify DOE of a change in the designated responsible party or main contacts for its ENERGY STAR CFL program participation within 30 days.

Performance for Special Distinction

In order to receive additional recognition and/or support from DOE for its efforts within the Partnership, the PARTNER may consider the following voluntary measures and should keep DOE informed on the progress of these efforts:

- Consider energy efficiency improvements in company facilities and pursue to benchmark their buildings through the ENERGY STAR Buildings program;

- Purchase ENERGY STAR qualified products. Revise the company purchasing or procurement criteria to include ENERGY STAR. Provide procurement officials' contact information to DOE for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes;

- Ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;

- Provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified product models;

- Feature the ENERGY STAR promotional or partner mark(s) on PARTNER web site and in other marketing materials. If information concerning ENERGY STAR is provided on the PARTNER web site, DOE may provide links where appropriate to the PARTNER web site;

- Provide a simple plan to DOE outlining specific measures PARTNER plans to undertake beyond the program requirements listed above. By doing so, DOE may be able to coordinate, communicate, and/or promote PARTNER's activities, provide a DOE representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that PARTNER would like DOE to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products; and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with DOE on one print advertorial and one live press event;

- Provide quarterly, written updates to DOE as to the efforts undertaken by PARTNER to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.

Below are the product criteria for ENERGY STAR qualified Compact Fluorescent Lamps (CFLs) - Version 4.0. A product must meet all of the criteria in order to be qualified as ENERGY STAR.

1) SCOPE: This ENERGY STAR criteria for CFLs covers the requirements for self-ballasted ~~, screw-based~~ CFLs and lamp systems, including:

A. Medium screw ~~based,~~or GU24 base compact fluorescent lamps with integral electronic ballasts.
B. Circline lamps with a maximum diameter of nine inches and square lamps, with a maximum side length of eight inches with ~~medium base~~ medium screw or GU24 based with electronic ballasts that are tested and packaged with the lamp.
C. ~~Medium-based compact~~Medium screw or GU24 based fluorescent lamps with integral electronic ballasts, which have a translucent cover over the bare fluorescent tube. The cover may be globe, bullet, pear, torpedo, candle, or any other shape.
D. Medium-screw and GU24 based ~~based~~ compact fluorescent lamps with integral electronic ballasts, which have a reflector that may be open or enclosed. The lamp shall be primarily intended to replace wide beam incandescent reflector lamps.

The intent of this ENERGY STAR program is to move consumers and businesses from incandescent to energy-efficient compact fluorescent lighting.

The ENERGY STAR qualified compact fluorescent lamps program is primarily intended to qualify products for residential and commercial applications.

2) DEFINITIONS:

A. **Self-ballasted compact fluorescent lamp**: A compact fluorescent lamp unit that incorporates, permanently enclosed, all elements that are necessary for the starting and stable operation of the lamp, and which does not include any replaceable or interchangeable parts.
B. **Rated voltage**: The voltage marked on the lamp.
C. **Rated wattage**: The wattage marked on the lamp.
D. **Rated supply frequency**: The frequency marked on the lamp.
E. **Initial performance values**: The photometric and electrical characteristics at the end of the 100-hour aging period.
F. **Rated luminous flux or lumen output**: Initial lumen rating (based on the measured 100-hour lumens), which is declared by the manufacturer.
G. **Lumen maintenance**: The luminous flux or lumen output at a given time in the life of the lamp and expressed as a percentage of the initial luminous flux.
H. **Average rated lamp life**: The length of time declared by the manufacturer at which 50% of any large number of lamps reaches the end of their individual lives.
I. **Lamp color**: The color characteristics of a lamp as defined by the color appearance and the color rendition.
J. **Color appearance**: The actual color of the lamp is called the color appearance and is defined in terms of the spectral tri-stimulus values (color coordinates) according to the recommendations of the CIE Publication No. 13.3 – 1995. For color coordinates near the black body loci, the correlated color temperature (Kelvin) can be used to define color appearance.
K. **Color rendition**: The effect the spectral characteristic of the light emitted by the lamp has on the color appearance of the objects illuminated by it is called color rendition. The color-rendering index is defined in terms of a comparison of the spectral tri-stimulus values of the objects under test illumination and standard illumination according to the recommendations of CIE Publication No.13.3-1995.
L. **Correlated Color Temperature (CCT)**: The actual color of the lamp is called the color temperature and is defined in terms of the spectral tri-stimulus values (color coordinates) according to the recommendations of IESNA LM-16. For color coordinates near the Black Body loci, the correlated color temperature, measured in Kelvin (K), is used.
M. **Starting time**: The time needed after switching on for the lamp to start fully and remain lighted.
N. **Run-up time**: The time needed after switching on the supply for the lamp to reach 80.0% of its stabilized luminous flux.
O. **Starting temperature**: The minimum and maximum temperatures at which the lamp will reliably start.
P. **Power factor**: The active power divided by the apparent power (i.e., product of the rms input voltage and

rms input current of a ballast).

Q. **Private Labeled CFL**: An ENERGY STAR qualified CFL lamp purchased and marketed under the brand of a PARTNER other than the manufacturer of the product.

R. **Retired or Discontinued Product**: A product that was properly qualified as ENERGY STAR, but is no longer manufactured (as of the date on the list), but may still be available in the market.

S. **MacAdam Color Ellipse**: An elliptical region of chromaticity coordinates that is defined using a centroid, a tilt angle relative to a horizontal axis, and a defined level of variance. Such a region defines what chromaticity coordinates can be acceptably associated with a target Correlated Color Temperature. For this criteria, standardized color ellipses are defined using centroids based upon objective chromaticities (x,y) and tilt angles (è) specified in Table 1 and 2 of ANSI C78.376-2001, and a defined variance of seven steps.

T. ANSI: American National Standards Institute.

U. NVLAP: National Voluntary Laboratory Accreditation Program.

V. A2LA: American Association for Laboratory Accreditation.

W. ICAT Fixture: Airtight Insulated Ceiling fixture.

X. Outdoor Reflector: A reflector CFL that is designed and marketed for use only in outdoor applications.

3) REFERENCE STANDARDS AND PROCEDURES: ENERGY STAR qualified compact fluorescent lamps and lamp systems shall comply with the relevant clauses of the following standards, unless the requirements of the ENERGY STAR CFL criteria are more restrictive:

ANSI C78.901-2001	*American National Standard for Electric Lamps – Single Base Fluorescent Lamps – Dimensional and Electrical Characteristics*
ANSI C78.5 – 1997	*Specifications for Performance of Self-Ballasted Compacted Fluorescent Lamps*
ANSI C78.375 – 1997	*Guide for Electrical Measurements of Fluorescent Lamps*
ANSI/IEEE C62.41 – 1991 (01-May-1991)	*Surge Voltages in Low-Voltage AC Power Circuits, Recommended Practice for*
CIE Publication No. 13.3 – 1995	*Method of Measuring and Specifying Color Rendering of Light Sources*
IESNA LM-9 – 1999	*Electric & Photometric Measurement of Fluorescent Lamps*
IESNA LM-40 – 2001	*Approved Method for Life Performance Testing of Fluorescent Lamps*
IESNA LM-65 – 2001	*Life Testing of Single-ended Compact Fluorescent Lamps*
IESNA LM-66-00 – 2000	*Electrical and Photometric Measurements of Single Ended Compact Fluorescent Lamps*
UL 1993 – 1993	*Standard for Self-Ballasted Lamps and Lamp Adapters*

Performance Characteristics	**Test Procedure**	
	Compact Fluorescent (*see note below*)	**Circle design**
Lumen Output and Efficacy	IESNA – LM66-00	IESNA – LM9
Lumen Depreciation and Life	IESNA – LM65 & ANSI – C78.5	IESNA – LM40
Color Rendering Index	CIE Publication 13.3 - 1995	
Transient Protection	ANSI/IEEE C62.41 (01-May-1991), Category A, 7 strikes	
Electromagnetic Interference	FCC 47 CFR including Part 2 (Equipment Authorization) and Part 18 (Technical Standards and Emission Limits) for consumer RF Lighting Equipment limits	

Notes:
Testing with reference ballast shall not apply to integrally ballasted compact fluorescent lamps.
These lamps shall be measured with their integral ballasts at 120 volts and 60 Hz.
ENERGY STAR qualified compact fluorescent lamps and lamp systems must comply as applicable with the labeling requirements of the U.S. Federal Trade Commission (16 CFR Part 305.1-.19; more information can be found on this web site: http://www.ftc.gov/bcp/conline/pubs/buspubs/applince.htm#howcomply or http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_16/16cfr305_00.html and the EMI requirements of the U.S. Federal Communications Commission located under 47 CFR including Part 2 (Equipment Authorization) and Part 18 (Technical Standards and Emission Limits) for consumer RF Lighting Equipment.

4A) BARE, COVERED, AND OUTDOOR REFLECTOR CFLS: PHOTOMETRIC TESTING REQUIREMENTS:

Criteria Item	ENERGY STAR Requirements	Sample Size /Specific Requirements	Laboratory Requirement
Lamp Power (Watts) & Configuration [1]	**Minimum Efficacy:** Lumens/watt (Based upon initial lumen data[2])	10 units per model – 5 base-up/5 base-down unless specific use or position is restricted by the manufacturer. If position restricted, manufacturer must test all 10 samples in restricted position.	Must use a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP)[3].
Non-speciality, Bare lamp: Lamp power < 10 10 ≤ Lamp power < 15 15 ≤ Lamp power < 25 Lamp power ≥ 25	 **50.0** **55.0** **60.0** **65.0**		
Specialty, Bare lamp (Dimmable/3-way): Lamp power < 15 15 ≤ lamp power < 25 Lamp power ≥ 25	 **50.0** **55.0** **60.0**		
Covered lamp (no reflector) Lamp power < 15 15 ≤ lamp power < 25 Lamp power ≥ 25	 **45.0** **50.0** **55.0**		
Outdoor Reflectors (*must specify outdoor use only*): Lamp power < 20 Lamp power ≥ 20	 **33.0** **40.0**		
1,000-hour Lumen Maintenance	Average lumen output measurement of the 10 lamps tested must be greater than 90.0% of initial (100-hour) lumen output @ 1,000 hours of rated life, and no more than 2 individual samples can have a lumen output measurement less than 85.0%.		
Lumen Maintenance at 40% of Rated Life	Average of the 10 samples tested must be greater than 80.0% of initial (100-hour) rating at 40% of model's rated life (Per ANSI C78.5, Clause 4.10), and no more than 3 individual samples can have a lumen output less than 75.0%.		
Correlated Color Temperature (CCT)	Manufacturer must identify one of the following designated correlated color temperatures to market their product as: 2700K, 3000K, 3500K, 4100K, 5000K, or 6500K, and at least 9 out of the 10 samples tested must fall within a 7-step ANSI MacAdam ellipse for that color temperature at the 100 hour lumen measurement. Please refer to Section 11 for CCT quality assurance requirements.		
Color Rendering (CRI)	Average of the 10 samples tested must be greater than 80.0, and no more than 2 individual samples can have a CRI less than 77.0.		

[1] Take performance and electrical requirements at the end of the 100-hour aging period according to ANSI C78.5. The lamp efficacy shall be the average of the lesser of the lumens per watt measured in the base-up and base-down positions or other specified/restricted position. Use wattages placed on packaging to select proper specification efficacy in this table, not measured wattage.

[2] Efficacies are based on measured values for lumens and wattages from pertinent test data. Wattages and lumens placed on packages may not be used in calculation and are not governed by this criterion. For multi-level, such as 3-way, or dimmable systems, measurement must be at the highest wattage setting listed for model. Acceptable efficacy and 1,000-hour and lumen maintenance at 40.0% of rated life average lumen output measurement error is – 3.0%.

[3] For a list of NVLAP accredited labs, visit http://ts.nist.gov/ts/htdocs/210/214/scopes/eelit.htm

4B) BARE, COVERED, AND OUTDOOR REFLECTOR CFLS: ELECTRONIC TESTING REQUIREMENTS[4]:

Criteria Item	ENERGY STAR Requirements	Sample Size/Specific Requirements	Laboratory Requirement
Power Factor	Average of 10 samples tested must be greater than 0.50.	10 units per model – 5 base-up/5 base-down unless specific use or position is restricted by the manufacturer. If position restricted, manufacturer must test all 10 samples in restricted position.	Use NVLAP or A2LA[5] accredited labs
Run-up Time: **Bare (Non-amalgam)**	Average of 10 samples tested must be less than 1.0 minute per ANSI C78.5, clause 3.11 and 4.8.		
Bare (amalgam), Covered, and Outdoor Reflectors	Average of 10 samples tested must be less than 3.0 minutes per ANSI C78.5, clause 3.11 and 4.8. Partners qualifying bare products must specify if their product contains amalgam mercury during the qualification submission process to be eligible for this requirement.		
Starting Time	Time after switching on until full start (and remain lighted), average of 10 samples shall be less than 1.00 second.		
Transient Protection	Per ANSI/IEEE C62.41 (01-May-1991), Category A, 7 strikes Note: One failure to meet 7 strikes will result in test failure and therefore, failure to meet the criteria.	A minimum of five (5) lamps tested in the base up position unless the product is labeled as a position-restricted by the manufacturer. If position restricted, test lamps in specified position (*Must be unique sample for this test only)*.	Self-certification[6]
Operating Frequency	≥ 40.0 kHz	1 unit per model	Self-certification
Electromagnetic Interference	Compliance with FCC 47 CFR including Part 2 *(Equipment Authorization)* and Part 18 *(Technical Standards and Emission Limits)* for consumer RF Lighting Equipment requirements for consumer limits	1 unit per model	FCC laboratory or manufacturer's laboratory[7]
Base	Edison (Medium) screw base - E26/24 Pin base – GU24	Self-certification	

[4]Input voltage must be 120 V and frequency must be 60 Hz.
[5]For a list of American Association for Laboratory Accreditation (A2LA), visit www.a2la2.net.
[6]Self-certification is a declaration of conformance by the manufacturer to the requirement. For self-certification where data are required (sample size is specified in the requirement), the manufacturer may use data obtained directly from the manufacturer's own facilities that are neither NVLAP nor A2LA accredited.
[7]Laboratory must be listed on FCC Office of Engineering & Technology web site, and with either NVLAP or A2LA accreditation.

4C) BARE, COVERED, AND OUTDOOR REFLECTOR CFLS: LIFETIME PERFORMANCE TESTING AND PACKAGING REQUIREMENTS:

Criteria Item and Submission	ENERGY STAR Requirements	Sample Size/Specific Requirements	Laboratory Requirement
Rapid Cycle Stress Test	Per ANSI C78.5 and IESNA LM-65 (clauses 2,3,5, and 6) Exception: Cycle times must be 5 minutes on, 5 minutes off. Lamp will be cycled once for every two hours of rated lamp life. At least 5 out of the 6 sample lamps must meet or exceed the minimum number of cycles.	6 units, base up or down as stated by manufacturer. *Must be unique sample for this test only.*	NVLAP, A2LA, or ISO9000 certified laboratories or facilities
Interim Life Test	@ 40% of rated life report on lamp life: ○ **One sample failure**, acceptable; ○ **Two sample failures,** requires submission of a product failure report from the manufacturer that describes in detail the specific reasons for sample product failures. ○ **Three sample failures**, does not qualify	10 units per model, 5 base-up/ 5 base-down, unless specific use or position appears on packaging. *Interim and final average rated lifetime tests must use the same samples.*	
Average Rated Lamp Life *(Final qualification)*	≥ 6,000 hours as declared by the manufacturer on submitted packaging and qualification form. PARTNER must complete lifetime test to stated rated lamp life on packaging (e.g., if CFL is marketed as a 10,000 hour CFL, it must complete the life time test to 10,000 hours).		
Warranty	Product packaging must state "Warranty" or "Limited Warranty" and have an "800" number, or mailing address, or web site address *(if applicable)* for consumer complaint resolution. **For Residential Applications:** Warranty or limited warranty statement must cover at least a minimum of **24 months, or 2 years,** from date of purchase based on **no less than 3 hour per day of use** (normal household use – follow the chart below). **For Commercial Applications:** Warranty or limited warranty statement must cover at least a minimum of **12 months, or 1 year**, from date of purchase.	Must submit electronic draft or hard-copy draft of specific CFL model. Packaging must include the following information to be reviewed for qualification requirements: *- Model number* *- Wattage* *- Lumen output (must be 100 hour average)* *- Average rated lifetime* *- Correlated color temperature - Warranty (based on application type and standard average hours/day)* *- 800 number, or address, or web address* *- Equivalency to incandescent (if applicable)* *- Starting temperature* *- Electromagnetic interference* *- Known incompatibility with controls and application exceptions (e.g., outdoor reflectors)*	Self-certification
Product Packaging Language	In English, or English with additional languages. For products that will be sold in Canada, packaging must include both English and French.		
FTC Labeling Requirements	ENERGY STAR qualified compact fluorescent lamps and lamp systems must comply with the labeling requirements of the U.S. Federal Trade Commission Packaging Laws - FTC 16CFR Part 305.1-.19.[8]		
Starting Temperature	Package must state the minimum starting temperatures or geographical zone of use and any other conditions for reliable starting to meet the starting time requirements of ANSI C78.5, Clause 4.7		
Incompatibility with Controls and Application Exceptions	Lamp package must clearly state any known incompatibility with photo controls, dimmers or timing devices. In addition, packaging should state specific applications exceptions. (e.g., applications that the CFL should not be used in).		

[8]For information on how CFLs must comply with the FTC's Appliance labeling act, visit http://www.ftc.gov/bcp/conline/edcams/eande/index.html

CFL/Incandescent Equivalency[9]	PARTNER must use the chart below to declare an incandescent equivalency based on the initial average 100-hour lumen output measurement. If the luminous flux falls outside of the specified range, either do not display an incandescent equivalent or display the lower incandescent wattage equivalence. *If displaying an incandescent equivalent for **Globe, Decorative type, or reflector CFL products**, the initial luminous flux for both the CFL and the appropriate incandescent bulb must be displayed side by side in a comparison panel, along with the wattage ratings for both the CFL and incandescent bulb.*	Average of data used from 100-hour lumen output measurement	NVLAP only

[9]If displaying an incandescent equivalence for commonly used A-shaped bulbs (for all bare type models and covered type models that replace an A-shaped incandescent bulb), the CFL's initial 100-hour luminous flux or lumen output must meet or exceed the following levels. The table shows typical luminous flux for A-shaped, soft white, incandescent bulbs. Based on research conducted by NLPIP (www.lrc.rpi.edu/NLPIP/Online/index.html), luminous flux varies considerably among bulbs. The table below is intended to aid in consumer choice and in no way supercedes or replaces any requirement for product performance contained in this specification. If the luminous flux falls outside of the range, either do not display an incandescent equivalence or display the lower incandescent wattage equivalence.

ENERGY STAR Qualified CFL Warranty and Lifetime Statements Chart – Residential Use Only

ENERGY STAR Qualified CFL Rated Lifetime	**Number of Years Claims** *(Based on minimum use of 3 hours/day)*
6,000 hours	5 years
8,000 hours	7 years
10,000 hours	9 years
12,000 hours	11 years
15,000 hours	13 years

CFL/Incandescent Equivalency Chart

A-Shaped Incandescent bulb (Watts)	**Typical Luminous Flux (Lumens)**[†] **† Lumens must be 100 hr, initial values for CFLs** *Note: excludes globes, reflectors, or decorative CFLs*
25	Minimum of 250
40	Minimum of 450
60	Minimum of 800
75	Minimum of 1,100
100	Minimum of 1,600
125	Minimum of 2,000
150	Minimum of 2,600

The Department of Energy is continuing to work with Pacific Northwest National Laboratory (PNNL) and industry to review alternative elevated temperature testing for CFL reflectors protocols. The draft testing requirements and sections (5A, 5B, 5C, 5D and 5E) have been shaded to indicate they have not changed since draft version 2. Once one protocol has gained consensus, the Department will release the draft testing requirements and sections (5A, 5B, 5C, 5D and 5E) for review and comment. Once the elevated temperature testing for CFL reflectors is finalized, the information will be added into the final criteria.

5A) REFLECTOR CFLS FOR RECESSED DOWNLIGHTS/INDOOR USE: PHOTOMETRIC TESTING REQUIREMENTS:

Criteria Item and Submission	ENERGY STAR Requirements	Sample Size/Specific Requirements	Laboratory Requirement
Lamp Power (Watts) & Configuration[10] Lamp power < 20 Lamp power ≥ 20	**Minimum Efficacy:** Lumens/watt (Based upon initial lumen data[11]) **33.0** **40.0**	10 units per model, all base-up position.	Use NVLAP accredited laboratory
Initial Elevated Temperature Light Output	Product will meet the minimum requirement of maintaining 90% of initial rated light output when operated in an 8" (nominal) deep ICAT down light installed in the UL 1598 thermal test apparatus for IC-rated luminaries. *The test must be performed according to the test procedures below. See 5D.*	1 unit per model, base-up position.	To be determined.
Elevated Temperature 1,000-hour Lumen Maintenance	Average lumen output measurement of the 10 lamps tested must be greater than 90.0% of initial (100-hour) lumen output @ 1,000 hours of life, and no more than 2 individual samples can have a lumen output measurement less than 85.0%. *Samples must be tested at 55˚C ± 5˚C in the Elevated Temperature Test apparatus, described below. See 5E.*	10 units per model, all base-up position.	To be determined.
Elevated Temperature Lumen Maintenance at 40% of Rated Life	Average of the 10 samples tested must be greater than 80.0% of initial (100-hour) rating at 40% of model's rated life (Per ANSI C78.5, Clause 4.10), and no more than 3 individual samples can have a lumen output less than 75.0%. *Samples must be tested at 55˚C ± 5˚C in the Elevated Temperature Test apparatus, described below. See 5E.*	10 units per model, all base-up position.	To be determined.
Correlated Color Temperature (CCT)	Manufacturer must identify one of the following designated correlated color temperatures to market their product as: 2700K, 3000K, 3500K, 4100K, 5000K, or 6500K, and at least 9 out of the 10 samples tested must fall within a 7-step ANSI Mac Adam ellipse for that color temperature at the 100 hour lumen measurement. Please refer to Section 11 for CCT quality assurance requirements.	10 units per model, all base-up position.	Use NVLAP accredited laboratory
Color Rendering (CRI)	Average of the 10 samples tested must be greater than 80.0, and no more than 2 individual samples can have a CRI less than 77.0.		

[10] Take performance and electrical requirements at the end of the 100-hour aging period according to ANSI C78.5. The lamp efficacy shall be the average of the lesser of the lumens per watt measured in only the base-up position. Use wattages placed on packaging to select proper specification efficacy in this table, not measured wattage.

[11] Efficacies are based on measured values for lumens and wattages from pertinent test data. Wattages and lumens placed on packages may not be used in calculation and are not governed by this criterion. For multi-level products, such as 3-way, or dimmable systems, measurement must be at the highest wattage setting listed for model. Acceptable efficacy, 1,000-hour and lumen maintenance at 40% of rated life average lumen output measurement error is – 3.0%.

5B) REFLECTOR CFLS FOR RECESSED DOWNLIGHTS/INDOOR USE: ELECTRONIC TESTING REQUIREMENTS[12]:

Criteria Item and Submission	ENERGY STAR Requirements	Sample Size/Specific Requirements	Laboratory Requirement
Power Factor	Average of 10 samples tested must be greater than 0.50.	10 units per model, all base-up position.	Use NVLAP or A2LA accredited labs
Run-up Time	Average of 10 samples tested must be less than 3.0 minutes per ANSI C78.5, clause 3.11 and 4.8.		
Starting Time	Time after switching on until full start (and remain lighted), average of 10 samples shall be less than 1.00 second.		
Transient Protection	Per ANSI/IEEE C62.41 (01-May-1991), Category A, 7 strikes Note: One failure to meet 7 strikes will result in test failure and therefore, failure to meet the criteria.	A minimum of five (5) lamps tested in the base up position unless the product is labeled as a position-restricted by the manufacturer. If position restricted, test lamps in specified position *Must be unique sample for this test only)*.	Self-certification[13]
Operating Frequency	≥ 40.0 kHz	1 unit per model	Self-certification
Electromagnetic Interference	Compliance with FCC 47 CFR including Part 2 *(Equipment Authorization)* and Part 18 *(Technical Standards and Emission Limits)* for consumer RF Lighting Equipment requirements for consumer limits	1 unit per model ~~Determined by Test Lab~~	FCC laboratory or manufacturer's laboratory[7]
Base	Edison (Medium) screw base - E26/24 Pin base – GU24	Self-certification	

[12]Input voltage must be 120 V and frequency must be 60 Hz.
[13]Self-certification is a declaration of conformance by the manufacturer to the requirement. For self-certification where data are required (sample size is specified in the requirement), the manufacturer may use data obtained directly from the manufacturer's own facilities that are neither NVLAP nor A2LA accredited.
[14]Laboratory must be listed on FCC Office of Engineering & Technology web site, and with either NVLAP or A2LA accreditation.

5C) REFLECTOR CFLS FOR RECESSED DOWNLIGHTS/INDOOR USE: LIFETIME PERFORMANCE TESTING AND PACKAGING REQUIREMENTS:

Criteria Item and Submission	ENERGY STAR Requirements	Sample Size/Specific Requirements	Laboratory Requirement
Maximum Ambient Temperature Rating for Reflectors	Maximum temperature rating of at least 50° C for which the warranty is valid.		Self-certification
Rapid Cycle Stress Test	Per ANSI C78.5 and IESNA LM-65 (clauses 2,3,5, and 6) Exception: Cycle times must be 5 minutes on, 5 minutes off. Lamp will be cycled once for every two hours of rated lamp life. At least 5 out of the 6 sample lamps must meet or exceed the minimum number of cycles.	6 units, all base-up position. *Must be unique sample for this test only.*	NVLAP, A2LA, or ISO9000 certified laboratories or facilities
Elevated Interim Life Test	@ 40% of rated life report on lamp life: ○ **One sample failure**, acceptable; ○ **Two sample failures,** requires submission of a product failure report from the manufacturer that describes in detail the specific reasons for sample product failures. ○ **Three sample failures**, does not qualify *Samples must be tested at 55˚C ± 5˚C in the Elevated Temperature Test apparatus, described below. See 5E.*	10 units per model, all base-up position.	To be determined.
Elevated Temperature Life Testing for Reflector Products *(Final qualification)*	≥ 6,000 hours as declared by the manufacturer on submitted packaging and qualification form. *Must follow the testing procedures below.*	10 units per model, all base-up position.	To be determined.
Warranty	Product packaging must state "Warranty" or "Limited Warranty" and have an "800" number, or mailing address, or web site address *(if applicable)* for consumer complaint resolution. **For Residential Applications:** Warranty or limited warranty statement must cover at least a minimum of **24 months, or 2 years,** from date of purchase based on **no less than 3 hour per day of use** (normal household use – follow the chart below). **For Commercial Applications:** Warranty or limited warranty statement must cover at least a minimum of **12 months, or 1 year**, from date of purchase.	Must submit electronic draft or hard-copy draft of specific CFL model. Packaging must include the following information to be reviewed for qualification requirements: *- Model number* *- Wattage* *- Lumen output (must be 100 hour average)* *- Average rated lifetime* *- Warranty (based on application type and standard average hours/day)* *- 800 number, or address, or web address* *- Starting temperature* *- Electromagnetic interference* *- Known incompatibility with controls and application exceptions* *- If displaying an*	Self-certification
Product Packaging Language	In English, or English with additional languages. For products that will be sold in Canada, packaging must include both English and French.		
FTC Labeling Requirements	ENERGY STAR qualified compact fluorescent lamps and lamp systems must comply with the labeling requirements of the U.S. Federal Trade Commission Packaging Laws - FTC 16CFR Part 305.1-.19.		

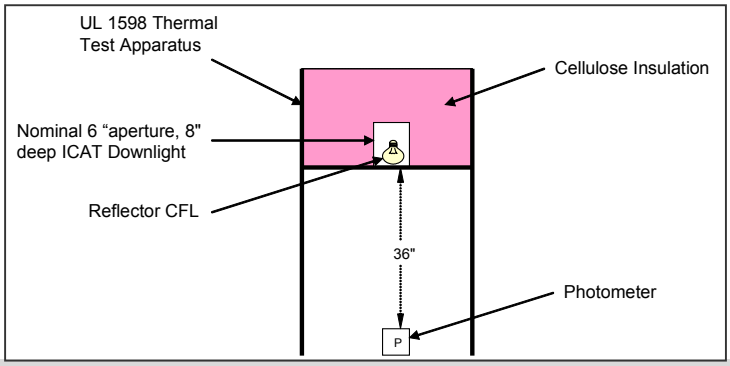
Starting Temperature	Package must state the minimum starting temperatures or geographical zone of use and any other conditions for reliable starting to meet the starting time requirements of ANSI C78.5, Clause 4.7.[15]	*incandescent equivalent for **reflectors,** the initial luminous flux for both the CFL and the appropriate reflector incandescent bulb must be displayed side by side in a comparison panel, along with the wattage ratings for both the CFL and incandescent bulb.*	
Incompatibility with Controls and Application Exceptions	Lamp package must clearly state any known incompatibility with photo controls, dimmers or timing devices. In addition, packaging should state specific applications exceptions. (e.g., applications that the CFL should not be used in).		

[15]For information on how CFLs must comply with the FTC's Appliance labeling act, visit http://www.ftc.gov/bcp/conline/edcams/eande/index.html

5D) INITIAL ELEVATED TEMPERATURE LIGHT OUTPUT TESTING PROCEDURE: The initial elevated temperature light output test procedure involves a two-step process. Lamps will initially be operated at in a nominal 6" aperture, 8" deep insulated ceiling, airtight (ICAT) downlight installed in the UL 1598 thermal test apparatus for IC-rated luminaries (Figure 1), less the insulation. This establishes the baseline illuminance corresponding to the light output determined under LM-66-00. Lamps will then be operated in the same apparatus with the insulation added. The ratio of the illuminance with insulation to the illuminance without insulation, expressed as a percentage, is Initial Elevated Temperature Light Output. The procedure is as follows:

1. Pre-burn the lamp according to IESNA LM-66-00.
2. Install the lamp in a UL 1598 apparatus equipped with a nominal 6" aperture, 8" deep ICAT recessed downlight housing such that the end of the lamp intersects the plane of the aperture.
3. Apply power to the lamp.
4. Allow the system to reach steady-state illuminance.
5. Record photometer measurements directly below the lamp (at the 0° angle or nadir).
6. Remove power from the lamp.
7. Fill the apparatus with in loose fill cellulose insulation to the levels specified in UL 1598.
8. Apply power to the lamp.
9. At six hours of operation, record photometer measurements directly below the lamp (at the 0° angle or nadir).
10. Test completed.

FIGURE 1: UL 1598 Thermal Test Apparatus

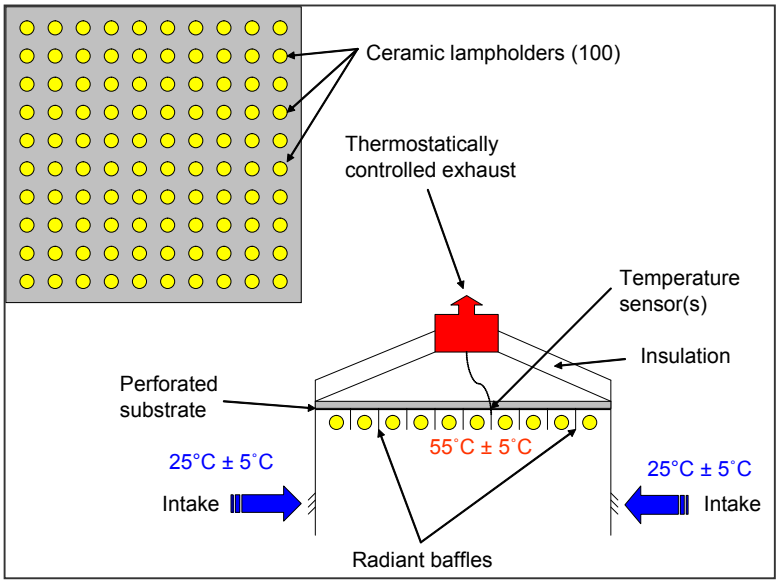


5E) ELEVATED TEMPERATURE TESTING PROCEDURE: Elevated temperature testing is conducted in a test apparatus capable of maintaining 55˚C ± 5˚C and otherwise following the IESNA LM-65-01 *Life Testing of Single-Ended Compact Fluorescent Lamps* test procedure. Elevated Temperature 1,000-hour Lumen Maintenance, Elevated Temperature Lumen Maintenance at 40% of Rated Life and Elevated Temperature Life Testing are all conducted in the Elevated Temperature Test Apparatus (Figure 2). The procedure is as follows:

1. Pre-burn ten (10) lamps according to LM-66-00.

2. Initiate the LM-65-01 test cycle.
3. When the apparatus reaches 55˚C ± 5˚C, record photometer measurements for each lamp. This establishes the baseline (initial) illuminance for 1,000 hour and 40% of rated life lumen maintenance requirements.
4. At 1,000 hours and steady state-illumination, record photometer measurements for each lamp. This establishes 1,000-hour illuminance. The ratio, expressed as a percentage, of the 1,000-hour illuminance to the baseline illuminance determined in Step 3 is the Elevated Temperature 1,000-hour Lumen Maintenance.
5. At 40% of rated life and steady state-illumination, record photometer measurements for each lamp and record any lamps failures for the interim life test requirement. This establishes 40% of rated life illuminance. The ratio, expressed as a percentage, of the 40% of rated life illuminance to the baseline illuminance determined in Step 3 is the Elevated Temperature Lumen Maintenance at 40% of Rated Life.
6. Continue testing until six (6) lamps fail or until rated life is achieved, whichever is least. Test completed.

FIGURE 2: Sample Elevated Temperature Test Apparatus



6) **CERTIFICATION:** Manufacturers shall certify that ENERGY STAR qualified compact fluorescent lamps sold using the ENERGY STAR certification mark have:

1. Been tested and third party listed to UL Standard 1993 for Self-Ballasted Lamps and Lamp Adapters by a Nationally Recognized Testing Laboratory (NRTL) accredited by Occupational, Safety, and Health Administration (OSHA),
2. Meet the manufacturers' declared performance and use criteria that are found on the packaging,
3. Meet or exceed the minimum performance criteria contained in this ENERGY STAR Criterion for the characteristics shown above.

7) **QUALIFICATION FOR BARE, COVERED, OR OUTDOOR REFLECTOR PRODUCTS:** PARTNERS can submit their bare or covered CFL for ENERGY STAR qualification by the following 2-step procedure:

A. STEP 1: Initial Qualification

PARTNERS must submit a report that includes the following **completed** tests (see below) from either their properly accredited laboratories or properly accredited third-party testing facilities, which must certify to the authenticity and integrity of the test data. In addition, PARTNERS must complete PAGE 1 and the accredited laboratories must complete PAGE 2 of the ENERGY STAR CFL Qualification Form and submit it with the packaging proofs. The test reports must indicate that the model meets all initial requirements. Incomplete test reports, product packaging, or qualification forms will not be accepted or processed for ENERGY STAR qualification. PARTNERS must complete the following tests before they will be considered for INITIAL ENERGY STAR qualification:

Bare and Covered Products:

- Efficacy (based on the 100-hour lumen output measurement)
- Rapid Cycle Stress Test
- 1,000-hour lumen maintenance
- Color Rendering (CRI)
- Correlated Color Temperature (CCT)
- Power Factor
- Run-up Time
- Starting-up Time
- Transient Protection
- Operating Frequency
- Electromagnetic Interference
- Lumen Maintenance at 40% of rated life
- Interim Life Time Test at 40% of rated life
- Packaging Review: All PARTNERS who are qualifying a CFL must submit electronic or hard copy labeling and packaging samples for the specific CFL model. Packaging must meet all of the requirements that are identified under the Lifetime Performance and Packaging Requirements. Failure to meet the packaging requirements will delay the qualification process and the CFL model in question will not be qualified until all packaging requirements are met. The specific qualified model must be distributed within this approved product packaging. If products are found being sold or distributed in alternative non-approved packaging, that model will be immediately disqualified from the ENERGY STAR for failure to meet the criteria. If a PARTNER has multiple cases where products are being sold in unapproved packaging, then it may result in their ENERGY STAR Partnership Agreement to be terminated.

Products that meet the above requirements will be considered initially qualified for ENERGY STAR and the PARTNER will receive correspondence (via e-mail or letter) stating the product has met all necessary **initial** requirements and can begin to market the CFL model as ENERGY STAR by using the certification mark on the product packaging, and identifying the product in marketing materials, and Web site.

B. STEP 2: Full Qualification For Bare, Covered, or Outdoor Reflector Products:
PARTNERS will be given a due date in their initial qualification letter to submit the **final average rated life time** test report to complete their ENERGY STAR CFL qualification process and fulfill the Full Qualification requirements. This due date will be based on the date the average rated lifetime test began and the rated lifetime of the CFL, which was recorded on the ENERGY STAR Qualification Form. Failure to submit this final test report within 60 days of completion of the test will result in an immediate disqualification of the model. After the final test report review, if a product does not meet the recorded average rated lifetime, then the disqualification process will be put into effect (see Sections 12 and 13).

Once a model is qualified, it must be requalified every **36 months** to ensure ongoing design or manufacturing changes maintain overall performance against the program requirements. See Section 14 for more information on the **ENERGY STAR CFL REQUALIFICATION PROCEDURE**.

8) QUALIFICATION FOR REFLECTOR CFLS FOR RECESSED DOWNLIGHTS/INDOOR USE: PARTNERS can submit their reflector CFL for ENERGY STAR qualification by the following 2-step procedure:

A. STEP 1: Initial Qualification
PARTNERS can submit their reflector CFL for ENERGY STAR qualification by submitting a report that includes the following **completed** tests (see below) from either their properly accredited laboratories or properly accredited third-party testing facilities, which must certify to the authenticity and integrity of the test data. In addition, PARTNERS must complete PAGE 1 and the accredited laboratories must complete PAGE 2 of the ENERGY STAR CFL Qualification Form and submit it with the packaging proofs. The test reports must indicate that the model meets all initial requirements. Incomplete test reports, product packaging, or qualification forms will not be accepted or processed for ENERGY STAR qualification:

- Efficacy
- Rapid Cycle Stress Test
- Initial Elevated Temperature Light Output
- Elevated Temperature 1,000 hour Lumen Maintenance
- Elevated Temperature Lumen Maintenance at 40% of rated lifetime
- Elevated Interim Life Test at 40% of rated lifetime
- Power Factor
- Run-up Time

- Start-up Time
- Correlated Color Temperature (CCT)
- Color Rendering Index (CRI)
- Transient Protection
- Operating Frequency
- Electromagnetic Interference
- Packaging Review: All PARTNERS who are qualifying a CFL must submit electronic or hard copy labeling and packaging samples for the specific CFL model. Packaging must meet all of the requirements that are identified under the Lifetime Performance and Packaging Requirements. Failure to meet the packaging requirements will delay the qualification process and the CFL model in question will not be qualified until all packaging requirements are met. The specific qualified model must be distributed within this approved product packaging. If products are found being sold or distributed in alternative non-approved packaging, that model will be immediately disqualified from the ENERGY STAR for failure to meet the criteria. If a PARTNER has multiple cases where products are being sold in unapproved packaging, then it may result in their ENERGY STAR Partnership Agreement to be terminated.

Products that meet the above requirements will be considered initially qualified for ENERGY STAR and the PARTNER will receive correspondence (via e-mail or letter) stating the product has met all necessary **initial** requirements and can begin to market the CFL model as ENERGY STAR by using the certification mark on the product packaging, and identifying the product in marketing materials, and Web site.

B. STEP 2: Full Qualification For Reflector CFLs for Recessed Downlights/Indoor Use:
Manufacturers will be given a due date in their initial qualification letter to submit the **elevated temperature life testing test report** to complete their ENERGY STAR CFL qualification process and fulfill the Full Qualification requirements. This due date will be based on the date the average rated lifetime test began and the rated lifetime of the CFL. Failure to submit this final test report within 60 days of completion of the test will result in an immediate disqualification of the model. After the final test report review, if a product does not meet the recorded average rated lifetime, then the disqualification process will be put into effect (see Sections 12 and 13).

Once a model is qualified, it must be requalified every **36 months** to ensure ongoing design or manufacturing changes maintain overall performance against the program requirements. See Section 14 for more information on the **ENERGY STAR CFL Requalification Procedure**.

9) PRIVATE LABELING PRODUCTS: Manufacturers, distributors, retailers, and other ENERGY STAR PARTNERS may purchase existing qualified CFL products and submit them for listing on the qualified product list by completing and submitting a Private Labeler qualification form (*available from your ENERGY STAR CFL Account Manager*) and product packaging draft for review and approval. Once the private labeler form and product packaging have been reviewed and accepted, the private labeling PARTNER will receive a letter from ENERGY STAR stating that this model will be added to the CFL qualified product list and can begin to use the ENERGY STAR certification mark on its packaging and marketed as an ENERGY STAR product.

A. Packaging for Private Labeled CFLs: PARTNERS must submit packaging proofs for each of their privately labeled CFLs with the exact information (wattage, lumen output, rated lifetime, equivalency, etc.) their supplier has submitted to ENERGY STAR, since the products are exactly the same. If packaging is submitted with incorrect information, the model will not be qualified as ENERGY STAR until the correct packaging has been submitted.

B. Changing of Qualified CFL Supplier: PARTNERS are required to inform ENERGY STAR within 30 days of changing their supplier of one or more of their privately labeled CFLs. PARTNERS must submit a new Private Labeler Form and new product packaging for each product to reflect the updated information.

NOTE: The private labeled products, or products with different model or product numbers, fall under the same quality assurance and disqualification protocol as the originally tested model. Therefore, if the original qualified model is disqualified from the ENERGY STAR program, the corresponding privately labeled model(s) will also be disqualified from the ENERGY STAR program.

10) COMMERCIAL PACKAGING OF PRODUCTS: ENERGY STAR qualified CFL products that will be bulk packaged for commercial sales must submit a package proof for the container that the qualified products will be shipped in and that clearly displays all of the required criteria to fulfill the packaging requirements for ENERGY STAR.

NOTE: Those PARTNERS found distributing qualified CFL products in unidentified packaging or white boxes will be contacted immediately and may immediately have that specific model disqualified from the program.

Once all requirements have been met for packaging, ENERGY STAR will list the new qualified model on the www.energystar.gov web site. All labeling must be in accordance with ENERGY STAR identity guidelines found in the Partnership Agreement/Program Requirements and FTC's Appliance Labeling Act regulations. Packaging and promotional materials using the certification mark should be submitted to your ENERGY STAR Account Manager for final review and approval.

11) **QUALITY ASSURANCE:** Original Equipment Manufacturers (OEM) PARTNERS will be required to provide ~~a~~ documentation that describes the measures they are taking ~~manufacturing process control plan as compliance documentation on measures they are taking~~ to assure their ENERGY STAR qualified CFLs and those products they sell to private labelers meet program and criteria requirements.

A. Manufacturing Quality Control ~~Processes~~Documentation: DOE will accept the following industry quality control processes:

- Adherence to the International Standards Organization (ISO) 9000 family of international quality management standards and guidelines, used as the basis for establishing quality management systems.
- Employment of the Six Sigma methodology to measure and improve a company's operational performance, practices and systems; or an equally recognized industry process.
- Other quality control systems or formats that are accepted industry standards.

B. Color Consistency: The following quality requirements must be met during the production runs of each lamp model:

1. The lamp manufacturer is required to maintain color control such that a **minimum of 90.0 percent** of the ongoing production (*as represented by samples tested from each production shift for the same color and when typically evaluated over 12 month period*) will fall within the seven-step MacAdam color ellipse associated with the designated (manufacturer declared) target color.

2. For the purposes of meeting color control, the lamp manufacturer must maintain testing equipment calibrated to international practices and standards and must compile the ongoing color control data in a manner so that is can be easily reviewed upon DOE request.

3. At a minimum, the manufacturer's color quality control program must maintain the following information for a 3-year period:

a. Test dates and sample size (minimum of two lamps per production shift)
b. Test results (x,y) for each sample lamp measured
c. Test results (all x,y data) for sample lamps plotted graphically against the designated seven-step color MacAdam ellipse and available for review at least on a quarterly basis

Records to substantiate that 90 percent of the (x,y) data points fall within the applicable seven-step MacAdam ellipse. Manufacturers are encouraged to exceed this target.

12) **INDEPENDENT ENERGY STAR CFL THIRD PARTY TESTING AND VERIFICATION PROGRAM:** Manufacturer, distributor, and retailer PARTNERS who are active members of the ENERGY STAR CFL program must participate in the ongoing, independent, third-party testing and verification system program, which uses independent, third-party, NVLAP accredited facilities. This third-party testing program is necessary to provide an active system to verify quality of ENERGY STAR qualified CFL products in the marketplace. This program will conduct random off-the-shelf testing of ENERGY STAR qualified CFLs and provide the results to the PARTNER.

A. An **independent program** has been selected as the means for third party testing for several fundamental reasons, including:

- It will allow for fair and open assessment of third party test data for the U.S. Department of Energy.
- It will serve as an effective fire-wall for proprietary data sent to the U.S. Department of Energy.

B. The **goals** of the Third Party Testing and Verification Program are to:

- Develop a CFL testing program that will aid DOE in maintaining quality control of its ENERGY STAR CFL Program;
- Develop a mechanism providing added assurance to ENERGY STAR PARTNERS that sponsor CFL Programs and to manufacturer competitors alike that qualified products do in fact meet the ENERGY STAR criteria;
- Provide a basis upon which the DOE can reasonably make decisions on disqualifying products not exhibiting the necessary qualifications to keep its ENERGY STAR qualification status;
- Maintain the precepts of the ENERGY STAR Program, the highest of which is that the consumer

receives superior products that perform as advertised.

C. Third Party Testing and Verification Program will be managed using funds derived from a percentage of testing fees and will have two committees, a **product selection committee and** a **technical and research committee**. These committees shall be representative of both manufacturer and non-manufacturer stakeholders.

1. Product Selection Committee: The Product Selection Committee will oversee the final product selection process for each testing cycle.

The Product Selection Committee will be comprised of **five representatives** – two members from industry (~~equipment~~ CFL manufacturers or distributors), two members from a lighting stakeholder group or utility, and DOE. The Third Party Testing Administrator will assist the committee.

To be eligible to serve on the Product Selection Committee, candidates must be recommended or nominated by their peers. The main criteria for membership on the product selection committee will be an unbiased view of the existing CFL marketplace, knowledge of current lighting market trends and consumer practices, and a demonstrated ability and desire to contribute to improving the overall quality of ENERGY STAR qualified CFLs. DOE will review committee nominations and select the candidates to serve on the committee. Once the product selection committee has been established, the committee members will serve for a period of two years.

2. Technical and Research Committee: The Technical and Research Committee will monitor technical and scientific developments involving lighting industry specifications, regulations, and testing processes. The committee's responsibilities include identifying new or updated product test procedures to incorporate into the program, evaluating testing uncertainties and data anomalies, identifying and recommending testing tolerance levels, and developing management protocols to address these topics. The committee will provide technical expertise to DOE and the Third Party Testing Program Administrator.

The membership of the Technical and Research Committee will consist of CFL manufacturers, accredited testing laboratories, and lighting stakeholder groups. DOE will select a Technical and Research Committee Chair to lead this committee and the Third Party Testing Administrator will assist the committee. This committee has no limit on the number of participating members.

To be eligible to serve on the Technical and Research Committee, candidates must be recommended or nominated by their peers. The main criteria for the selection of technical and research committee members will be based on their lighting expertise – candidates must be able to demonstrate their proficiency in CFL design, measurement testing, or statistics, along with a demonstrated ability and desire to contribute to improving the overall quality of ENERGY STAR qualified CFLs. DOE and the Committee Chair will review committee nominations and then DOE will select the candidates to serve on the committee. Once the Technical and Research Committee has been established, the committee members will serve for a period of two years and are eligible to renew their committee membership after the two years is complete.

D. Third Party Tests to be conducted: All tests listed below will be conducted as per the qualification stipulations of the current ENERGY STAR criteria for CFLs. These tests will form the basis for product qualification verification:

1. Bare, Covered, and Outdoor Reflector Products:
- Initial Efficacy
- Rapid Cycle Stress Test
- Correlated Color Temperature (CCT)
- Color Rendering Index (CRI)
- Run-up Time
- Start Time
- 1,000 Hour Lumen Maintenance
- Lumen Maintenance at 40% of rated lifetime
- Interim Life Test at 40% of rated lifetime
- Power Factor

2. Reflector Products for Recessed Downlights/Indoor Use:
- Initial Efficacy
- Rapid Cycle Stress Test

- Correlated Color Temperature (CCT)
- Color Rendering Index (CRI)
- Run-up Time
- Start-up Time
- Initial Elevated Temperature Light Output
- Elevated Temperature 1,000 hour Lumen Maintenance
- Elevated Temperature Lumen Maintenance at 40% of rated lifetime
- Elevated Interim Life Test at 40% of rated lifetime
- Power Factor

E. Product Nomination, Selection and Procurement Process: The timing of the nomination and testing cycles will be scheduled around the normal ENERGY STAR lighting market transformation activities (e.g., Change A Light Campaign) to provide ample time for product appeals, discontinuations, or disqualifications. The suggested product nomination and selection timetable and process is:

1st Cycle Distribution of Nomination Forms:	September 15
1st Cycle Random Product Generation:	September 20
1st Cycle of Product Nomination Due:	October 15
1st Cycle Review of Product Nominations (with randomly selected products):	November 1
1st Cycle Final List of Products:	November 15
1st Cycle Product Procurement:	November 15-Jan 31
1st Cycle Product Testing Begins:	February 1
2nd Cycle Distribution of Nomination Forms:	March 15
2nd Cycle Random Product Generation:	March 20
2nd Cycle of Product Nomination Due:	April 15
2nd Cycle Review of Product Nominations (with randomly selected products):	April 28
2nd Cycle Final List of Products:	May 15
2nd Cycle Product Procurement:	May 10-June 30
2nd Cycle Product Testing Begins:	July 1

F. Product Nominations *(please refer to Figure 3):*

1. Products will be selected for third party testing on both a random and nomination selection basis. The program will target to test 20% of the total number of current qualified bulbs during a calendar year; ~~approximately 10%~~ half of the products ~~testing pool~~ will be selected via a random generator, the other half~~10% of the product testing pool~~ will be selected by DOE and participating ENERGY STAR partners (utilities, manufacturers, states, efficiency program sponsors, or other government entities (e.g., Natural Resources Canada)~~) will nominate the remaining products~~.

2. The product testing pool will be comprised of all ENERGY STAR qualified CFLs. Including all qualified products within the product testing pool will provide the allowance to test the maximum number of products per year. Once a product is confirmed for testing within the Third Party Testing Program, the Third Party Testing Program Administrator will identify whether the nominated product has other SKUs, retail items or product designations listed on the ENERGY STAR qualified product list. If the nominated product does, then those accompanying products will be removed out of the product pool to remove the possibility of any redundant testing of the same specific technical design or product.

3. A maximum of six ~~bulbs~~ models per CFL PARTNER may be tested within the fiscal year (two-cycle timeframe).

4. Qualified CFL products that are within six months of its requalification date will be excluded from an upcoming testing cycle.

5. Following the suggested schedule timeline, the Third Party Testing Program Administrator will send all interested parties a nomination form to complete. The parties who wish to nominate products will be required to submit their nominations electronically by the specified deadline to the Third Party Testing Program Administrator.
   During the 30-day product nomination timeframe, the Third Party Testing Program Administrator will generate a list of qualified products through the random generator. This initial product list will be reviewed to identify which products are readily available in the marketplace and which products are not. Those products that are not readily available in the marketplace will be removed from the nomination group.

6. ~~Manufacturer~~ PARTNERS who wish to nominate other ~~manufacturers or~~ PARTNERS' ENERGY STAR qualified CFLs will be required to follow the nomination guidelines. The basic guidelines will address the following:
   - *Product nomination limits*: Will be limited to nominate no more than two ~~products~~ models per manufacturer per testing cycle.
   - *Rationale for product nomination*: Will need to supply evidence on the poor performance of a product, which can include test data, consumer complaints, product returns, etc. Nominations submitted without ample evidence to demonstrate the need for third party testing will be disregarded.

G. Product Selection: Submitted product nominations forms will be collected and compiled with the list of randomly selected products by the Third Party Testing Program Administrator.

The Third Party Testing Program Administrator will distribute the overall list of product nominations (random generator and PARTNER nominations) to the Product Selection Committee to review. The Third Party Testing Program Administrator will organize a conference call (or meeting) with the Product Selection Committee to discuss the product nominations and finalize a list of products to test within each cycle. The Product Selection Committee will have five business days to review the nominations and approve the final list of products to test per testing cycle.

DOE will approve the final product list and then the Third Party Testing Program Administrator will contact each CFL PARTNER to inform them their product or products will be tested. In addition, the Third Party Testing Program Administrator will also notify the PARTNER which participating NVLAP accredited laboratory they will be working with.

H. Costs of Third Party Testing and Verification Program and Laboratory-PARTNER Logistics:
PARTNERS will pay for the testing of their products. The fee will vary as a function of the rated lifetime of the product. Included in the fee will be a per model charge for the Third Party Program Administrator services, which will not exceed 20%.

1. Each participating laboratory will provide a quotation to the specific ENERGY STAR CFL PARTNER. This quotation will include the testing, procurement, and shipment costs and a confidentiality clause that automatically permits the test laboratory to release the data to the Third Party Program Administrator and to the manufacturer and only to them. PARTNERS will send payment directly to the testing facility within the allotted timeframe.

2. Costs for product procurement will be set at a flat fee plus the total retail costs of the samples (*to be determined by participating lab(s)*). The flat fee costs covers the logistical costs to purchase the products (transportation, telephone, hotel, etc.). The laboratories will work to identify the best retail price to procure the products. The procurement prices will be reviewed after each cycle to identify whether the cost needs to be adjusted.

3. Costs for product shipment to the testing facility will be a uniform cost (*to be determined once participating lab(s) have been selected for the program*).

4. Third Party Testing Program Administrator Fees will cover (*estimating 20% of overall testing costs*):
   - Test Report Development
   - Coordination of accredited NVLAP laboratories
   - Verification of Qualified Product Information
   - Coordination of Technical and Nomination Committees
   - Notify PARTNERS of product selection and provide selected laboratory information
   - Administrative tasks (conference calls; mailings; etc.)

5. PARTNERS whose products are retested due to marginal failure will pay for the retest and any additional product samples and shipment costs needed to complete the retest.

I. Product Procurement: PARTNERS will assist the assigned laboratory in identifying distribution channels to purchase products from and products will be purchased from these identified retail sources or Internet shopping venues.

At a minimum, at least two different date or lot codes will make up the samples of bulbs per model tested. Products will be purchased in accordance with these procurement guidelines:

- Store Selection: If available, samples must be purchased from a minimum of three different retail or commercial outlets.
- Geographic location selection: At a minimum, samples must be purchased from two (2) separate geographic regions of the U.S. The recommended number of locations is four (4).
- Collection of the following information:
    - Lot numbers
    - Date code
    - Geographic location of purchase (city, State, zip code, store number)
    - Retailer or distributor where product was purchased

J. Information Flow and Data Management: Each PARTNER having product tested will receive the complete test reports for its product(s) directly from the testing laboratory. The Third Party Testing Program Administrator will also receive the complete testing reports from the testing laboratory. The Third Party Testing Program Administrator will deliver the compiled test results to DOE to review and identify which products met the ENERGY STAR criteria.

1. DOE will notify PARTNERS of one of the following outcomes:

    - Qualification verification
    - Marginal failure
    - Intend to disqualify the product

2. The Third Party Testing Program Administrator will be responsible for archiving information for each testing cycle to develop consolidated trend data reports. These data reports will include:

    - Overall pass/fail statistics
    - Pass/fail statistics by product type
    - Statistical scatter plots of measured performance test data
    - Statistical analysis of mean, median
    - Year-by-year or round-by-round trend data

~~3.~~The Third Party Testing Program Administrator will prepare a consolidated trend data report that will include all trend data identified in section 12.J.2.~~s and this~~ This report will be made available ~~for a nominal fee~~ to ~~all~~ interested parties.

~~**K. Costs and Funding of Third Party Testing and Verification Program:** PARTNERS will pay for the testing of their products. The fee will vary as a function of the rated lifetime of the product. Included in the fee will be:~~

~~□A per model charge for the Third Party Program Administrator services, which will not exceed 20%~~
~~□Laboratory fees for product testing and product procurement.~~

~~1.Costs for product procurement will be set at a flat fee plus the total retail costs of the samples (*to be determined by participating lab(s)*. The flat fee costs covers the logistical costs to purchase the products (transportation, telephone, hotel, etc.). The laboratories will work to identify the best retail price to procure the products. The procurement prices will be reviewed after each cycle to identify whether the cost needs to be adjusted.~~

~~Costs for product shipment to the testing facility will be a uniform cost (*to be determined once participating lab(s) have been selected for the program*).~~

~~2.Third Party Testing Program Administrator Fees will cover (*estimating 20% of overall testing costs*):~~
~~□Test Report Development~~
~~□Coordination of accredited NVLAP laboratories~~
~~□Verification of Qualified Product Information~~
~~□Coordination of Technical and Nomination Committees~~
~~□Notify PARTNERS of product selection and provide selected laboratory information~~
~~□Administrative tasks (conference calls; mailings; etc.)~~

~~3.PARTNERS whose products are retested due to marginal failure will pay for the retest and any additional product samples and shipment costs needed to complete the retest.~~

~~4.Consolidated test data reports will be made available to all interested parties for a nominal fee of $. These fees will go towards offsetting testing and administrative costs.~~

L. Testing Review Process: Based on the results and incorporation of measurement tolerances, DOE will categorize the tested products into three groups:

- Qualification verification
- Marginal failure
- Intent to disqualify

Qualification verification is defined when a product meets or exceeds all of the ENERGY STAR qualification testing requirements of the third party testing program.

Marginal failure is defined as having one sample exceed the allowable failure rate for one test. An example of a marginal failure is a result of 4 out of 6 samples passing the rapid cycle stress test or if the interim lifetime testing results in failure of 2 samples (out of the 10 samples). The reason behind the establishment of a marginal failure is if a product meets or exceeds all of the other testing requirements, especially the efficacy and 1,000-hour lumen maintenance tests and fails the rapid cycle stress test, it then causes a conflict on the quality of the product. To provide a reasonable and fair alternative, DOE will follow the process below to gather additional data to help resolve the performance issues.

Marginal Failure Process:

1. After testing has been completed through 40% of rated lifetime, products will be reviewed to identify a marginal failure. If a product is deemed a marginal failure, DOE will immediately contact the PARTNER and inform them.
2. At this time, DOE will institute an immediate re-test for ~~either~~ the test that was failed to verify the initial results. DOE will instruct the Third Party Testing Program Administrator to coordinate with the participating testing lab(s) to procure the samples and ship them to one of the approved third party testing laboratories.
3. In addition, the PARTNER can request to receive the failed lamp(s) so they can perform an autopsy analysis on the product.
4. During this re-testing process, the product in question will retain its ENERGY STAR qualification status to avoid confusion or unnecessary administration costs to prematurely remove product from the retail channels.
5. If the re-test results in the product meeting the originally failed~~rapid cycle stress~~ test requirement, it will remain ENERGY STAR qualified. If the product fails the requirement re-test, then DOE will institute the disqualification appeals process (see below).

Intent to disqualify is defined when a product fails one or more of any of the ENERGY STAR qualification testing or Third Party Testing requirements. If a product is so categorized, DOE will begin the **disqualification appeals process**.

13) DISQUALIFICATION APPEALS PROCESS: The following product disqualification process applies to both the normal ENERGY STAR qualification process and the Third Party Testing and Verification System.

A. For those products intended to be disqualified, DOE will work with the its ENERGY STAR CFL program contractor to develop an official letter to inform the PARTNER of DOE's intend to disqualify the product based on the Third Party Testing results.

1. DOE will contact the PARTNER by e-mail or by hard copy letter to inform of the intent to disqualify the model(s) and will provide 30 days for the PARTNER to respond to the notification. Within this 30-day period, the product(s) in question will remain designated as ENERGY STAR qualified to avoid any consumer confusion or unnecessary logistical costs.
2. If a product is designated for disqualification as a result of the Third Party Testing, the PARTNER can submit a request to the testing laboratory to receive the failed lamp(s) so that the manufacturer can perform an autopsy analysis to try and determine the root cause of the failures.
3. During the 30-day appeals timeframe, a PARTNER can present to DOE conclusive manufacturing or design evidence, or quality assurance information on why their product did not perform up to ENERGY STAR standards and how the manufacturer has addressed the identified performance issues (poor efficacy or lumen maintenance, early failures, etc.).

4. If the PARTNER does not respond within 30 days or does not supply sufficient evidence or quality assurance information to why their product should continue to be ENERGY STAR qualified, DOE will move forward and disqualify the PARTNER'S product(s) (and any corresponding retail products or SKUs or private labeled products) and will send a letter to the PARTNER to specify the following actions they must complete:
   - The PARTNER must immediately stop shipment of the specific model(s) and corresponding product or packaging configurations so it inhibits the product from entering into the retail or distribution markets further;
   - The PARTNER must cease use of the ENERGY STAR certification mark on the disqualified model's packaging design, web page, and other marketing materials. The ENERGY STAR Partnership Agreement stipulates the specific actions necessary to stay in compliance with the program;
   - To requalify a product, the manufacturer must make the necessary improvements to the product(s) design or manufacturing process and resubmit all completed test reports, qualification forms and corresponding packaging proofs demonstrating full compliance with the current ENERGY STAR criteria for CFLs.
   - Products that have been disqualified from the ENERGY STAR CFL program must wait six months from the disqualification date to submit for requalification.
   - In addition, a pattern of disqualifications may result in termination of the Partnership Agreement.

B. Within the Third Party Testing and Verification System, once the 30-day appeals timeframe begins, DOE will send correspondence to all utility, regional efficiency program sponsors, retailers, and lighting stakeholders to provide a timeline when the final product disqualification list will be distributed. After the 30-day appeals timeframe, DOE will compile the final list of products that are disqualified from the program and will distribute this information to these groups via the following communication avenues:

- E-mail announcement
- Posting as "disqualified" on the ENERGY STAR CFL qualified product list and search

C. After a product is officially disqualified, retailers, distributors, or other consumer channels will have **90 days from the disqualification date** to remove or sell off existing inventory or cover up the ENERGY STAR certification mark on the product packaging so that is it not identified as an ENERGY STAR qualified product.

D. In addition, within the Third Party Testing and Verification System, if a PARTNER has at least three products selected for testing (out of the maximum six) and all of the tested products fail, then this will automatically initiate mandatory testing for all of the manufacturer's qualified products.

E. Disqualification of a model can also result from evidence of non-compliance with the ENERGY STAR Partnership Agreement and/or criteria.

14) **ENERGY STAR CFL REQUALIFICATION PROCEDURE:** Once a model is qualified, it must be **requalified every 36 months** to ensure ongoing design or manufacturing changes maintain overall performance against the program requirements.

To requalify a product, PARTNERS must follow the current ENERGY STAR CFL qualification testing procedure and complete all of the required tests except for the Electromagnetic Interference (EMI) test. The ENERGY STAR CFL program contractor will track and inform PARTNERS when their qualified products must begin testing for requalification. The 36-month requalification clock will not start until the product has achieved full qualification under Version 4.0 (completion of all required tests including average rated lifetime test) ~~of a qualified product is completed~~. Specifically, PARTNERS must:

A. Submit their product for requalification testing at an accredited NVLAP testing facility within 45 days of notification from the ENERGY STAR CFL Account Manager.

B. Submit the test qualification reports and product packaging to the ENERGY STAR CFL Account Manager for review and approval.

Products that meet the ENERGY STAR criteria will continue to be recognized as ENERGY STAR qualified. Products that fail to meet the criteria will be categorized for immediate disqualification.

15) **RETIREMENT/DISCONTINUATION OF PRODUCTS:** PARTNERS who are discontinuing or retiring a model need to

submit to their ENERGY STAR CFL Account Manager ~~account representative~~ a formal letter stating the specific date this model will be out of the marketplace so it can be identified on the qualified product list as "retired/discontinued " since it will no longer be available.

16) **EFFECTIVE DATE:** The effective date for the ENERGY STAR Program Requirements and Criteria for CFLs – Version 4.0 will be **January 1, 2007,** and replaces all previous versions. All products, including models originally qualified prior to Version 4.0, must meet the new Version 4.0 requirements in order to use the ENERGY STAR certification mark on products or product literature by **January 1, 2007**. ~~Manufacturers may begin to test and submit products under Version 4.0 upon DOE's release of the final criteria document.~~
    - Resubmission of Most Current Test Report: Partners that have existing qualified products meeting the future Version 4.0 criteria requirements can submit the most recent qualification test report to their ENERGY STAR CFL Account Manager showing the product meets all Version 4.0 criteria requirements, including the additional CCT/chromaticity requirements and any of the consistency criteria changes. This process will be applicable for Bare, Bare-Specialty, Covered, and Outdoor Reflectors.
    - New Testing: Existing products that will not meet the future Version 4.0 criteria requirements will need to submit new testing reports to their ENERGY STAR CFL Account Manager to demonstrate the product will meet Version 4.0. CFL reflectors that are designated for recessed Downlights or indoor use will need to be requalified to the elevated temperature testing requirements once they are identified.

    All products that qualify under the Version 4.0 criteria will have 36-months from the product's full qualification date to requalify the CFL product.

17) **FUTURE CRITERIA REVISIONS:** ENERGY STAR reserves the right to change the criteria should technological and/or market changes affect its usefulness to consumers, industry, or the environment. Within one year of the effective date of this version, ENERGY STAR will review comments and suggestions for future revisions to the current criteria.

Appendix A:

DUTIES AND RESPONSIBILITIES OF THE THIRD PARTY TESTING AND VERIFICATION SYSTEM PROGRAM ADMINISTRATOR:

1) MANAGEMENT OF THE PARTICIPATION OF NVLAP ACCREDITED TESTING LABORATORIES:

- Identifies which laboratory will conduct the testing for each product.
- Develops a rotating testing schedule, to include all laboratories participating in the program, taking into account each facility's testing capacity.
- Monitors the laboratory's work to assure the laboratory(ies) are following the testing schedule and are meeting the identified deadlines for report submissions and updates. If there are delays in the product procurement or other areas of the schedule, the Administrator will work with DOE and the laboratories to revise the testing schedule and will notify the selected CFL PARTNERS of the updated schedule.

2) MANAGEMENT OF THE THIRD PARTY TESTING PROCEDURE:

- Program Administrator will notify the PARTNERS which testing laboratory will conduct its tests.
- Each participating laboratory will provide a quotation to the specific ENERGY STAR CFL PARTNER. This quotation will include the testing, procurement, and shipment costs and a confidentiality clause that automatically permits the test laboratory to release the data to the Program Administrator and to the manufacturer.
- PARTNERS will send payment directly to the testing facility and will assist in identifying distribution channels to purchase products from.
- The testing laboratory will distribute up to 20% of the testing cost to the Program Administrator for management and administrative costs. The testing laboratory will be responsible for product procurement and delivery to their testing facility.
- The testing laboratory will deliver the final testing reports to the individual manufacturers and the Third Party Testing Program Administrator.
- The Third Party Testing Program Administrator will deliver the cycle summary test reports to DOE to review and identify which products met the ENERGY STAR criteria. DOE will notify PARTNERS of one of the following outcomes:
  - Qualification verification
  - Marginal failure
  - Intend to disqualify the product
- The Third Party Testing Program Administrator will prepare generic consolidated trend data reports and provide these to all interested parties ~~manufacturers and utility, state, and regional efficiency groups~~. Consolidated trend data reports will include overall pass/fail statistics, pass/fail statistics by product type, statistical scatter plots of measured performance test data, statistical analysis of mean, median, and year-by-year or round-by-round trend data without identifying specific manufacturers or model numbers.

3) VERIFICATION OF QUALIFIED PRODUCTS:

The ENERGY STAR CFL program contractor will work with the Third Party Testing Program Administrator to review the following parameters to assure the most accurate information is being used to manage the program:

- Which products are manufactured and which are private labeled
- Verification of Where Products are Sold/Distributed
- Product Disqualifications or Discontinuations
- PARTNER Contact Information

FIGURE 3: Product Nomination and Selection and Information Flow and Data Management