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Via e-mail: lamps@energystar.gov.

January 30, 2013

Ms. Taylor Jantz-Sell
Environmental Protection Agency
Energy Star Lighting Program Manager
1200 Penn, Ave NW 6202J
Washington, DC 20460

Re: **GE Lighting Comments on ENERGY STAR Program Lamp Specification v1.0 Draft 3**

Dear Ms. Jantz-Sell,

GE Lighting appreciates the opportunity to comment on draft 3 of the Lamp specification v1.0. As a manufacturer of both CFL and SSL (LED) Lamps we understand the challenges of trying to combine both specifications. GE supports the comments submitted by the National Electrical Manufacturers Association (NEMA).

GE's comments are divided into five sections to better highlight the adverse impact of some of the elements of the proposal on the consumer experience, national energy consumption, higher manufacturer—and resulting consumer—cost, unnecessary compliance complexity and a discussion of provisions we believe are technical or text errors . The objective of our

comments is to improve the specification of the LAMPS 1.0 standard and the effectiveness of the **ENERGY STAR®** program.

I. The proposed specification in sections 9.1, 9.7 and 11.5, as applied to covered CFLs, risks eliminating this entire product category from the Program

The specification, by combining covered lamps (A-line) and Bare Spiral into the same lamp category, thereby requiring them to share the same LPW requirement, sets a level for covered CFLs that is too high for any manufacturer's products to meet, **essentially eliminating the covered CFL lamp category.**

The cover that is placed on a spiral CFL to give the product a familiar A-line shape has resulted in greater consumer up-take of CFL products, especially where aesthetic or decorative appearance is important. However, the cover causes a reduction in overall lumen output by a minimum of 10% due to its optical properties. The cover is generally made of plastic but in some cases is a piece of frosted glass.[1]

We have been told that the Program's objective is to set a specification that is technology neutral, in part to simplify administration. The result, however, is virtually to eliminate the entire covered CFL category, Whatever the benefits of simplifying administration, adopting sections 9.1, 9.7 and 11.5 of the proposal is not supported by technology and would have several unintended and undesirable consequences:

[1] For many products, the reduction in lumens is closer to 15% because of the cost implications of using certain materials.

A. Eliminating covered ENERGY STAR CFL product categories will undermine utility programs just when utilities have begun to shift rebate dollars to these specialty lamps in an effort to encourage consumers who have rejected spiral products to make the switch and try the covered models. Because covered CFLs are more expensive than spiral CFLs, utility rebate programs help to greatly increase consumer willingness to purchase covered CFLs.
B. Eliminating covered ENERGY STAR CFL product categories will have the perverse effect of increasing energy consumption. If only 5 million of the 15-25 million covered CFLs where not sold because they were eliminated from utility rebate programs because they were eliminated from the ENERGY STAR Program, the country would forgo the 346.5 million lbs. of Carbon Dioxide Emissions, 1.34 million lbs. of Sulfur Dioxide, 667 thousand lbs. of NO2 and 3.5 million mg of mercury per year from increased power generation eliminated by their use.[2] Therefore, GE believes it is critical to set achievable ENERGY STAR specifications for covered CFL lamps.

GE completed a statistical analysis comparing the LPW data for covered A-line lamps listed on the ENERGY STAR website against the proposed LPW limit of 65. That analysis shows that less than 2% of the covered A-line lamps meet the proposed 65 LPW requirement. See Attachment 1, Appendix A for the results of the analysis. ENERGY STAR should re-examine any analysis based the current database data before continuing to propose the higher LPW requirement. [3]

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[2] This analysis is based on replacing 60W incandescent with 15W CFL lamps.

[3] In a meeting with GE on January 16, 2013, held by teleconference, GE understood ENERGY STAR representatives as stating that the Program's analysis confirmed that 93% of ENERGY STAR qualified omni-directional lamps, both CFL and LEDs, would be able to meet the 65 LPW requirement. This analysis, however, did not take into consideration the impact on LPW of the specification provision in sections 9.7 and 11.5. But, possibly even more significant, EPA's analysis appears to have included bare spiral designs, most of which will meet the proposed 65 LPW requirement. A proper analysis of the covered products listed on the ENERGY STAR website requires a full understanding of industry descriptive codes to separate the covered from bare.

The specification draft would eliminate the 3% lumen tolerance/allowance[4]and, thus reduce lumen ratings by at least the same percent. When the analysis of the covered A-line data was repeated with the 3% lumen measurement tolerance removed, only 1 lamp out of 330 ENERGY STAR qualified lamps met the 65LPW rating.

The R9 color rendering index (CRI) requirement in Section 9.7 further increases the difficulty of covered CFLs to achieve the 65 LPW requirement. Achieving that level of the R9 color can only be done by redesigning lamps by changing the formulation of the lamp's phosphor. At its most basic level the formulation change would add more red phosphor until the lamp met the new R9 specification. It is a simple matter of physics that the long wavelengths associated with the color red are less visible to the human eye than the other colors in the visible light spectrum. As a result, more energy must be used to produce it. In short, the higher the CRI, the more energy used by the lamp and the lower the resulting LPW. In the case of CFL's, the reduction in LPW is from 68 to 58 (15W spiral), at least 5 % below the efficacy limit proposed for a 15W lamp.

The third burden on covered A-line CFL LPW is the required reduction in Run up time in section 11.5. This can most effectively be achieved by changing the lamp's electronics to overcome the warm-up time that naturally occurs when the lamp is first turned on. The additional electronics and circuitry would drop the overall efficiency by 1-2%.

In summary, Draft 3's overall effect on the LPW of covered A-line lamps LPW is as follows:

% Change in LPW (Covered lamps) = Cover (-10% minimum) + CRI (-5%) + Run up time (-2%) + Measurement Error (-3%) = - 20%

This essentially means that a manufacture would have to increase the efficiency of the current approved lamps by a minimum of 20 % to account for all the other changes in the specification BEFORE they can even begin to

[4] The CFL specification not in effect, V4.3, in foot note #2, allows a 3% tolerance. The footnote has been eliminated in the current proposal.

start to understand how to increase the lamps overall efficiency to some higher level.

The combined impact of sections 9.1, 9.7 and 11.5 on A-line CFL products would be to require a 35% increase in LPW over the existing specification, which is not technically feasible today through the proposed effective date of the specification.

For the reasons set forth above, GE urges the Program to set the efficacy limits of omnidirectional covered lamp at the same level as that for decorative lamps, i.e., the same as proposed in version 4.3.

Lamp		Med screw	Cand screw
Bare spiral	<15W	55 lpw	50 lpw
	>=15W	65 lpw	n/a
Covered (no reflector)	<15W	45 lpw	40 lpw
	>=15W	50 lpw	n/a

II. Given inherent thermal inefficiencies of the LED pad, the proposed specification in sections 9.1 for an 18% increase the LPW of >15W solid state lighting (SSL) is too aggressive.

While the proposed LPW increased for lower-wattage lamps is 9%, the increase for SSL lamps >15W higher wattage lamp LPW increased by 18%. EPA has not provided a technology justification for this disparity. Based on capability, one would have expected lower-wattage lamps to see a greater % increase in LPW performance. As the LED pad temperature increases, the LED becomes less efficient at producing light. For example, in a low-wattage lamp, the LED pad temperature is 70C while the LED pad in the high-wattage lamp temperature is 90C. Based LED industry data LPW decreases by 1.5% for each 5 degrees of LED pad temperature rise. (Cree Data sheet CLD-DS05 rev 15A page 6.) This 20C temperature increase would correlate to a 6% loss or decrease in LPW. This phenomenon can be overcome by adding LEDs and running at a lower drive current. This

solution would add significant cost and make other criteria—lumen output, CCT and lumen maintenance--more difficult to attain.

Because of the additional LPW required to compensate for the LED thermal inefficiency, the proposed LPW increase for SSL lamps >15W should be revised downward to align with the proposed increase for low-wattage lamps. This can be accomplished by changing the proposed LPW for the higher power (> 15 watts) omnidirectional lamps back to the V1.0 D2 requirement of 60 LPW.

III. The proposed specification in sections 9.1, 9.5, 9.7, 10.1, 10.2 and 11.5, would impose unnecessary cost on manufacturers, which would lead to higher prices at retail

If manufacturers incorporated all the proposed specification changes in their products, again assuming that could be done in the case of A-line CFLs, it would result in significant price rises for consumers. As staff of the Program is fully aware, price resistance continues to be an impediment to greater consumer acceptance of energy efficient lighting, historically for CFLs and, now, LEDs. As discussed, *supra*, any reductions in consumer purchases would imperil the environmental gains achieved through the efforts of EPA, the manufacturers, utility rebate programs and other stakeholders. GE urges the Program to adopt its suggestions, which will moderate product cost increases while maintaining product quality and efficiency.

A. The Section 9.7 CRI R9 requirement is not justified to address consumer concerns regarding light quality. Leaving the CRI requirement at the level of the existing specification would resolve any such concern: the human eye cannot perceive a difference between current products and products containing an R9=0. In particular, 2700 K CFL products, industry's largest selling CFL, cannot provide R>0 color performance using the current coating designs.

In addition to causing a reduction in LPW (see above), a higher R9 value would increase product costs without resulting consumer benefit since a modest R9 increase is imperceptible. (See above.) See Attachment 1, Appendix B for additional details.

B. The Section 10.1 lumen maintenance testing and Section 10.2 Life test requirements add cost for no meaningful benefit. The draft specification acknowledges that DOE has promulgated a test procedure for base-up (BU) lamp operation. Nonetheless, and without explanation ENERGY STAR proposes to require base-down (BD) testing at 45C or 55C ambient for the life and lumen maintenance.

BU application simulates worst case lamp operation. There is no data to support a contention that high temperature tests for BD applications will weed out low-quality lamps. In BU applications (down-lights, recessed cans) lamp ambient temperatures are higher because the heat generated by the lamp collects within the can or enclosure and slowly raises the ambient air in which the lamp operates. The testing of lamps in the BD position (table lamp, uplight) at elevated temperatures does not present a real-world operating condition. It does not, therefore, assure increased quality or additional value. Rather, it would compel the manufacturer to overdesign the lamp and consumers to pay the resulting price increase.

DOE also requires BD life tests at 25C. The draft specification would require the manufacturer to run multiple tests in different conditions that would adversely affect cost and lab testing capacity. The added cost would slow creation and introduction of energy efficient products.

We urge Program staff to limit life tests and lumen maintenance tests for BU and BD positions to 25C for all lamps, except reflector (directional) lamps, which should retain the elevated temperature test

since this is how the products are intended to be used. See Attachment 1, Appendix C for additional details.

C. In addition to the negative impact on LPW, discussed above, the 120 seconds run-up time requirement for lamps over 15W (Section 11.5) is overly stringent and would significantly increase product cost. Standard design for CFL lamps >15W will not meet the 120 second starting requirement because the arc-tube in these lamps is much greater in length than that of products with ≤15 wattage. This means that more time is needed for mercury in the arc-tube to properly distribute and fully activate within the arc tube.

   Based on tests of different manufactures and GE product, the average run-up time (80% stabilized light output) average for lamps ≥20W is 145 sec. See Attachment 1, Appendix D

   We recommend that ENERGY STAR adopt a tiered approach, such that CFLs >15W would be required to achieve 80% stabilized light output in ≤ 150 seconds while CFL ≤15W would remain at proposed requirement.

D. GE supports the comments filed by the National Electrical Manufacturers Association (NEMA) on lamp packaging. GE questions the benefit of requiring any changes to the packaging for the hundreds of millions of lamps that will continue to satisfy every element of the specification *except* the new packaging requirements. The impact of the Section 15.2 requirements are significant because changing just one word would require new printing plates and essentially a complete packaging change. For GE alone the additional cost would exceed $1 million just for ENERGY STAR changes if all products were required to be immediately changed. And, while we have the advantage of scale, smaller companies would be significantly more burdened on a per-product basis.

   GE recommends that EPA provide manufacturers with the flexibility to implement any new packaging provisions that remain in the final

version as new products are introduced or as packaging is changed on existing lamps for other reasons. This "running change" would allow the manufacturer to more painlessly implement packaging changes.

For solid state lighting (SSL), there is no consumer benefit in taking up valuable packaging "real estate" to include a minimum operating temperature (-20 C or below) on the label: all ENERGY STAR qualified LED lamps being produced must be able to operate down to -20C. We recommend that this requirement for LED products be removed.

Finally, because of the real estate constraints on certain packages, manufacturers should have the option of providing some detailed information on the inside of the packaging or on a packaging insert. The exterior packaging already has warnings about proper use and certifications required by other agencies and consensus standards bodies.

E. GE urges EPA to return to the position regarding luminous intensity distribution for decorative lamps that was contained in V1 Draft 2. As was recognized in the earlier draft, there is no basis for a luminous intensity distribution requirement for decorative lamps. Unfortunately, however, draft 3, in Section 9.5, treats decorative lamps as if they were omnidirectional lamps even though the total light output in 90-180 region is only 5%. The proposed change would result in added cost to both the LED and optics. Overall in the last 3 years we have sold many decorative lamps yet there have been no complaints about the lighting quality associated with the light intensity distribution.

We recommend that ENERGY STAR return to the V1 Draft 2 proposal; there simply would be no real benefit to consumers. These lamps are not used for omnidirectional applications. If, however, a specification is to be set, a limit of 5% light between 90 and 135 degrees might give the end user a more representative light output of current decorative products.

IV. The increased testing and compliance requirements of the current specification would result in greater testing costs and compliance complexity with little concomitant consumer benefit.

Suggested changes will lower product testing costs and reduce compliance complexity while maintaining program integrity. Increasing testing costs will increase product costs which will ultimately lower national energy savings as previously explained.

Page 6, Section 6 Federal Standards and DOE rulemaking

We agree to be aligned with Federal Standard requirement (DOE) to avoid duplicate testing, but this draft will still keep duplicate testing for BD. To avoid duplicate testing this specification should take into account BD life test requirements of the DOE, 10CFR 430 and 29 (at 25C). See GE proposal for section 10.

Page 10, Section 9.1 Passing test of Luminous Efficacy

In section 9.1 there are 2 sets of "pass-fail" criteria for lamps, where one essentially looks at the average value of the data and the other is focused on the individual lamp data. There are few scenarios where the average data would produce a situation where < 8 lamps would pass the light out criteria. Has EPA seen with testing data on approved lamps that indicate a need for this dual requirement?

We recommend using the criteria from version 4.3: 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.

Page 7, Section 7.1 Product Variations

EPA mentioned in their note on page 8, for SSL, CCT was not added as an allowable variant because EPA did not receive compelling data to make such allowance. We would like to better understand the data that was made available and found non-compelling by the EPA. We strongly believe for a particular product family with the same LED manufacturer and LED driver, the difference in the Color temp or CRI will not impact the rapid cycle test results. We would like to see a product variant for CCT and CRI for complying with the SSL rapid cycle test requirement.

Shown below you will find data from 522 LED lamps that completed the Energy Star rapid cycle test. The lamps represent multiple color temperatures and accumulated over 1 million cycles. There were no lamp failures and in turn, no difference in performance due to color temperature or CRI.

Color Temp	# of Lamps	Cycles	Failures
2700	222	427,475	0
3000	228	476,225	0
4000	72	129,015	0
Total	522	1,032,715	0

We recommend adding to table 2, page 7 – the following Allowable Variations:

- Lamp Attribute : CCT and CRI for SSL
- Allow Variation : Rapid cycle test required only from the tested representative model (independent of lamp's color temp, must be same manufacturer of LED)
- Additional Test Data – none

Page 11.2 Power Factor: All Lamps, specific to <u>Low Voltage Lamps.</u>

As we have noted in the NEMA comments PF is attributed to the product that is connected directly to the branch circuit/mains (120 V) and cannot be verified on a low voltage lamp. The following is data that shows how much the PF can change dependent on the type of transformer/driver used in conjunction with the low voltage

Measured MR16 **Power Factor** Lab Supply (LS) vs. Transformer					
Design Type - Driver	LS	LS (PF)	Electronic transformer + lamp PF		
Lamp	12VDC	12VAC	XFMR ABC	XFMR BCD	XFMR EFG
Driver Type 1	12	0.71	0.72	0.63	0.54
Driver Type 2	12	0.9	0.84	0.77	0.83
Driver Type 3	12	0.93	0.87	0.76	0.9

We recommend excluding low voltage lamps from power factor requirements.

<u>V.</u> The last section of comments covers important technical or editorial errors or clarifications with the proposed standards. Suggested changes are proposed to provide clarification or correct errors in the proposal.

Page 19, Section 10.1 Reported value of lumen maintenance

The requirement for reported values in Draft 3 has 3 set of criteria and it is not clear which one or if all criteria has to be met to be considered a pass.

The reported value for units tested in a restricted position shall be the average of the surviving unit values.

The reported value for units tested both BU and BD shall be the lesser average of surviving units measured values calculated for each orientation

Alternately the reported values shall be the result of one of the samples randomly selected and tested where the value is less than or equal to the lower 1) mean of the samples or 2) the lower 97.5 % confidence limit (LCL) of the true mean divided by 95%

Reference to DOE reported value (alternate option) is not correct since that requirement is meant to look at the total sample size (5 lamps) and not one individual lamp.

We recommend using the average value for reporting, and removing the alternative reporting value.

Page 8, Section7.5 Rounding

We agree that the standard be aligned with the Federal Standard requirement for rounding luminous efficacy, lumen maintenance, life and rapid cycling values. (see Appendix W to Subpart B of Part 430, Section 3 (iii) for Medium Base Compact Fluorescent Lamps). However, the rounding rule for CRI is missing.

We recommend rounding CRI to the nearest whole number.

The reason is that the CRI limit is given in whole number. Therefore, we propose to round average of CRI to a whole number as well. A lamp with a CRI of 79.8 is exactly same as a lamp with a CRI of 80 in that a customer wouldn't be able to see any difference between them.

Page 18-20, Section 10.1 Lumen Maintenance & Rated Life

Specific to SSL for determining the average lumen maintenance, as written it would be hard to average out test artifact that would not be seen in application. EPA requires VBU and VBD to be averaged separately and the reported lumen maintenance value shall be the lesser of the two averages.

We can do our best in controlling our chambers to the specify temperature with tolerance. However, there will always be thermal gradients that may influence the Lamp's Lumen Maintenance in a particular position. We believe if you see greater than a 3 % difference in Lumen Maintenance between VBU and VBD it is related to the product's performance. We recommend changing the method of calculating Lumen Maintenance for SSL products to the following:

- If units are tested both base-up and base-down, the average of the surviving unit measured values shall be calculated for each orientation, and the reported lumen maintenance shall be (1) If the Lumen Maintenance value between VBU and VBD is 3 or less percent, then all surviving lamps (both VBU and VBD) should be averaged and reported out. Or (2) if the differences in averages is greater than 3% , the reported lumen maintenance will be lesser of the two averages (VBU and VBD)

Summary

We believe that addressing the above GE comments will strengthen the ENERGY STAR standard and better meet the goals of EPA and it partners. We are particularly concerned about the potential elimination of covered CFLs and product cost increases. We estimate that CFL ENERGY STAR products that could meet the proposed standard would need to increase in price by 15% to 30% if none of our comments are addressed.

Thank you for allowing GE the opportunity to provide comments on the ENERGY STAR Lamp Specification V1.0, Draft 3.0. Please let us know if you would like to have a follow-up discussion to answer any questions that you may have pertaining to our comments.

Please contact David Szombatfalvy, Tom Stimac (216-266-2756) or Joe Howley (216-266-9729).

Sincerely,

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Parameter	CFL v4.3	Lamps v1.0 Draft 2	Lamps v1.0 Draft 3	Consequence
LPW	Bare>= 15w: 65lpw, Covered>=15w: 50lpw Reflectors: 33 or 40 LPW (if </>=20W)	Bare>= 10w: 60lpw, Covered (A-line) >=10w: 60lpw Directional >=10W: 45 LPW Deco >=10W: 50LPW	Bare>= 15w: 65 lpw, Covered (A-line) >=15w: 65lpw Directional 40 or 50 LPW (if </>=20W) Deco: 45 or 50 LPW (if < / >=15W)	Industry wide A-line shape lamps **would not** meet spec. . **See data analysis from EPA data base (next sheet)** No A-line CFL's with ES logo will be on the shelves 43 current GE models approved at v4.3 Technically impossible to improve to the bare spiral level

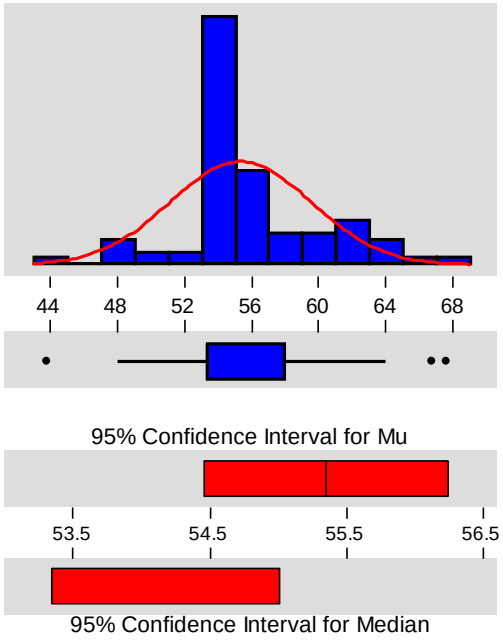
GE recommendation: Split bare spiral and A-line shape covered lamps into 2 different categories:

Lamp		Med screw	Cand screw
Bare spiral	<15W	55 lpw	50 lpw
	>=15W	65 lpw	n/a
Covered (no reflector)	<15W	45 lpw	40 lpw
	>=15W	50 lpw	n/a

LPW data for covered Aline CFL >=15W

Raw data from EPA website

http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=LB



Variable: LPW

Anderson-Darling Normality Test

A-Squared:	4.702
P-Value:	0.000
Mean	55.3519
StDev	4.1926
Variance	17.5775
Skewness	0.587638
Kurtosis	0.895637
N	87
Minimum	43.7500
1st Quartile	53.3333
Median	53.3333
3rd Quartile	57.8947
Maximum	67.5000

95% Confidence Interval for Mu

54.4584 56.2455

95% Confidence Interval for Sigma

3.6488 4.9283

95% Confidence Interval for Median

53.3333 55.0000

2% of Aline CFL-s >15W would meet 65LPW limit

46% of these CFL-s would meet 55LPW limit

Conclusion : Define 2 categories for LPW

Parameter	CFL v4.3	Lamps v1.0 Draft 2	Lamps v1.0 Draft 3	Consequence
Color rendering	Ra>80 (average of 10 units) 3 of 10 units can be less than 77	Ra>=80 (average of 10 units) 3 of 10 units can be less than 77 R9>0	Ra>=80 (average of 10 units) 3 of 10 units can be less than 77 (>75) R9>=0	All 2700K lamps should be redesigned LPW will be lowered No benefit for customers

- CFL, since the start of Energy Star, have not had a R9 requirement (10 years)
- Requires redesign of all 2700K lamps (extra phosphor component required) industry wide. Adds 2-3 % in lamp variable cost.
- R9 > 0 will not have any benefit to the end customers. A study shows there is no visual difference ; see study for R9 comparison between R9=-4.3 and R9=10 (next slide)
- This requirement will lower the LPW of the lamp and cause greater redesign to meet the R9 specification and the LPW specification .

GE recommendation: Remove R9>=0 for CFL

Parameter	CFL v4.3	Lamps v1.0 Draft 2	Lamps v1.0 Draft 3	Consequence
Life and LM test				
Bare spirals and deco	25C in BU and BD All directional at 55C	Elevated ~ 55C Directional, semi-directional, and omnidirectional ≥ 10W (Annex A) Directional, commercial grade (Annex A, Option A)	Omnidirectional ≥ 10W test at 25C in BU and at 45C in BD Directional >20W test at ~55C (Option A or B test method)	Require redesign. Large investment is needed for built up testing capacity 45C test in BD position doesn't reflect the actual application (table lamp for example is open air)

-Use of non reflector lamps in downlights is a misapplication, it is difficult and costly to design around all types of misapplications.

-The process of building up testing capacity requires ~0.5 Million USD and 1 year setup period (excluding NVLAP approval) before testing could even start.

- Design cost impact for a more robust ballast design: +(5-10)%

-Testing does not follow the technical items used in the DOE protocol

(10 CFR 429.35 a) sampling plan for selection of units for testing, (2) (iii), references test method of LM 65)

GE recommendation: Remove elevated temp life and lm maintenance test for all CFL except reflectors or adjust Test Method A to include BD

Elevated temperature life test GE alternative proposal

Draft 3: requires CFL elevated temperature life test only in BD position.

All omnidirectional lamps ≥ 10W shall be tested in accordance with the
E.S. Elevated temperature life test using the Option A or option B or option C test method
With an operating temperature of 45C (+/-5C)
Test method A and B is applicable for BU only

GE proposal:

1. Allow test method A for BD application
2. In the future the EPA may consider the use of accelerated life test

Test Method A , with BD represents a misapplication condition

Parameter	CFL v4.3	Lamps v1.0 Draft 2	Lamps v1.0 Draft 3	Consequence
Run-up (Lumens vs time)	Amalgam 80% of stable lumens < 180 sec Non-amalgam 80% of stable lumens < 60 sec.	Covered CFL 100% of stable lumens in < 90 sec Other CFL 100% of stable lumens in < 60 sec Secondary light sources used during run up must be off by 60 seconds	Covered CFL 80% of stable lumens in <=120 sec Other CFL 80% of stable lumens in < 60 sec No secondary light sources mentioned Why secondary light source is not mentioned?	Redesign of high wattage covered lamps to more expensive solutions or retire

- Covered CFL >15W shall achieve 80% stabilized light output in <= 150 sec
- Standard design covered lamps >15W will not meet 120 sec because

Longer arc-tube requires longer time for Hg distribution.

GE recommendation: Tier approach: <=15W and >15W

Wattage	run up
<=15W	120sec
>15W	150sec