



October 14, 2005

The NEMA Lamp Section submits the following written comments in response to the Department of Energy's Energy Star Program request for stakeholder input on the draft revisions to the CFL Energy Star specification dated August 30, 2005.

These comments supplement the comments NEMA companies made at the September 20, 2005 stakeholder meeting and already submitted in writing on October 5. We appreciate Energy Star convening the meeting and believe it facilitated some productive exchanges among partners with different points of view. As noted during the meeting, the draft specification contains many points on which we require clarification and some points that we think need to be changed.

Efficacy levels for bare and covered products

It was stated during the Energy Star presentation on September 20th that the draft efficacy levels were determined through a review of the average efficacy levels for all products submitted since the Version 3.0 specification went into effect in January 2004. We have the following concerns about the draft efficacy levels and how they were determined:

1. According to the Energy Star Qualified Product List dated 9/28/05, roughly 99% of "bare" products qualified after 1/1/04 are of the spiral or mini-spiral type. Thus, the draft efficacy levels inherently favor the spiral lamp configuration.

NEMA companies offer both spiral and non-spiral lamps. The reason we offer lamp designs other than spirals is that we have found that an important fraction of consumers want other shapes, and these shapes save energy when consumers use them instead of incandescent lamps. Spirals are good for many applications – that is why our companies make them – but not for all applications.

We would remind all partners and stakeholders that by far, the chief energy savings from CFL lamps is realized when a CFL replaces an incandescent lamp. For example, much more energy is to be saved as a result of this change than from replacement of an 18W CFL with a 17W CFL. Saving energy is much more than having high LPW ratings. In fact, it is easy to confuse high efficacy with energy savings. The LPW bar has been moved to a point when it would adversely impact energy savings by eliminating products with LPW that are 4 to 5 times higher than incandescent or halogen lamps.

Further, we do not think that the Energy Star criteria should so specifically target a particular technology when many technologies offer the bulk of the savings to be realized from the replacement of incandescent lamps.

2. In response to a question during the presentation on September 20th, it was revealed that the average efficacy values used to determine the new draft levels are based on the average of the 5 base-up and the 5 base-down samples. This is interesting as it conflicts with the actual language of the requirement that the lower of the two efficacy values, BU or BD be used when determining compliance. As graphed, they provide a very optimistic view of current product efficacies.
3. The proposed specification does not recognize the important energy savings that come from non-LPW considerations. For example, important energy savings come from dimmable CFLs and 3-way CFLs. The changes we propose reflect the importance of these designs.
4. We discussed in some detail during the development of the version 3.0 Energy Star specification that the efficacy standards should not be changed until some control was gained over the allowable chromaticities of the lamps. The proposed version 4.0 specification sets chromaticity limits on lamps, but we have no experience on the effect of these chromaticity limits on the efficacies found in the marketplace. We think it is better to gain some field experience before making big efficacy changes. We favor a more gradual approach.
5. The proposed specification does not recognize that energy savings may relate more closely to lamp efficacy in the particular application than to the rated lamp efficacy. Lamp manufacturers have tried to capture these savings by the use of amalgam designs. Such designs maintain their high efficacy over a much broader temperature range – i.e., a much broader application range – than non-amalgam lamps. We raise the concern here even though our chief message is not that amalgam lamps need different LPW standards. Rather, our concern is that amalgam lamps have longer run-up times than non-amalgam lamps, and the run-up part of the proposed specification penalizes amalgam lamps, and thus makes it more difficult for consumers to realize the potential energy savings that amalgam lamps can bring to the application.

For all of the above reasons, we think that the proposed specification makes too big a leap in efficacies. As an alternative to the August 30th proposed levels, we propose the following, for non-dimmable, non-reflector bare and covered lamps:

Lamp Power (Watts) and Configuration	Minimum Efficacy: Lumens/watt
Bare Lamp	
Lamp Power < 15W	50.0
15W = Lamp Power < 30W	60.0
Lamp Power = 30W	65.0
Covered Lamp	
Lamp Power < 15W	45.0
15W = Lamp power < 19W	48.0
19W = Lamp Power < 25W	50.0
Lamp Power = 25	55.0

The graph included at the end of these comments also shows these proposed levels.

We suggest that non-reflector lamps capable of being dimmed to less than 50% of full wattage, and 3-way, non-reflector lamps where the lowest wattage is less than or equal to 50% of the highest wattage, should be exempt from an efficacy criterion.

One manufacturing stakeholder inquired at the Sept. 20 meeting whether there is any tolerance range for rated versus measured efficacy near the border between two lamp power categories. The following example was proffered: Suppose a nominal 15W lamp, when measured, reads 14.3W. Is its efficacy standard that for a 15W lamp or that for one below 15W? DOE remarked it would take this issue under advisement. (The agreement between rated and actual wattage is already covered by FTC regulations.)

Our suggestion is that the efficacy criterion that applies is the one that corresponds to the rated wattage on the package, as noted in footnote 1 on page 5 of the draft specification. The efficacy standard used should match the rated wattage on the package.

Individual Lamp Deviations from Average Lumen Maintenance (and CRI) Values

Also during the meeting, there was a lot of discussion about the value of the added maintenance criterion “and no more than 2 individual samples can have a lumen output measurement less than x%” (where x depends on the time of the reading). It was explained that this criterion was needed to prevent that there be too great a difference in lumen output between lamps. We think this criterion is not appropriate for the following reasons:

- We think such a criterion cannot be statistically justified.
- We understand from the Sept. 20 meeting that this criterion is not based on any field complaints. In fact, as pointed out in the stakeholders meeting, incandescent lamps have an end of life maintenance less than 80% (IES handbook), yet we believe it is very

uncommon for consumers to replace an incandescent lamp before it fails because it has less light output than its neighboring lamp – even a brand new neighboring lamp in the same room and in the same field of view. We believe the problem this criterion is meant to address is an imagined one, and not one based on fact.

- If the average lumen maintenance figure is met and this criterion is not, that means that some of the lamps had exceptionally good maintenance. Wouldn't the same logic behind this criterion mean that we should penalize a manufacturer for making some lamps with exceptionally good maintenance? We think not; we should make our lamps to have the best maintenance we can, and not design them for some lower, attainable, average value.

It was noted by Energy Star in the September meeting that another approach considered for this criterion was to specify that the lumen maintenance must be x% with a certain standard deviation for the group of lamps. While this approach makes more sense to us philosophically, given the field situation it is meant to address ("uniform" lumen depreciation), we think that the field problem is not a real one, and we feel in principle that manufacturers should be encouraged to emphasize high quality rather than lower, but more uniform quality.

We have the same opinion about the parallel criterion for CRI. We do not believe the problem is a real one, and in any case, if 2 or more lamps have exceptionally low CRI, we think it impossible that this can be compensated for by lamps with exceptionally high CRI, assuming the same phosphor blends are used.

To be clear, we favor dropping all of the new language designed to tighten the uniformity of lumen maintenance and CRI performance beyond the average values specified.

Correlated Color Temperatures

As mentioned many times in the past, there is a strong technical link between correlated color temperature (CCT) and efficacy, and for that reason, we think increases in efficacy should be gradual until we know the effect of the new chromaticity limits. Energy Star has been very responsive to this coupling in the past, and both Energy Star and NEMA companies are working together to address the issue.

In addition, we note that the proposed specification provides that manufacturers must identify one of a set of CCTs for marketing their products. We are concerned that these "Kelvin" designations will mean little or nothing to the consumer. The DOE, EPA and NEMA have been active in 2005 with the LRC to develop a better way to communicate the concept of CCT to the consumer. We suggest that the Energy Star specification remain flexible on how this CCT information is to be conveyed until the results of our joint effort are formalized in late 2005 or early 2006. If no clear improved communication tool is agreed upon by the time v. 4.0 is ready for release, then we will request a meeting with DOE to review the status of the NEMA color designation project at that time.

Run-up time

The version 4.0 draft has reduced the allowable run-up time for bare lamps from to one minute, down from 3 minutes in version 3.0. As indicated in the meeting on September 20th, the new limit was based on data from the lamps qualified since 1/1/04, which are primarily spiral lamps. While amalgams are used in spiral designs, their use tends to be limited to the higher wattages. Thus, the run-up data are skewed towards non-amalgam lamps.

We do not believe it is the intent of the version 4.0 draft to effectively outlaw lamps made with energy-saving amalgam technology. It is clear from Jeff McCullough's presentation at the Sept. 20 meeting that amalgam reflector lamps require 2-3 minutes to warm up, and the same is true for non-reflector types.

Since energy saving amalgam lamps, especially bare lamps, typically need a longer run-up time, we strongly suggest that the run-up time for bare lamps be left at 3 minutes.

Operating Frequency

The existing requirements carried over into the draft version 4.0 require that the lab performing FCC testing determine the operating frequency. We believe this is overly burdensome and totally unnecessary. The operating frequency can be determined quite reliably with equipment commonly available in any manufacturer's development laboratory. In addition, we propose that the Sample Size be changed to 1 unit per model, and that the Laboratory Requirement be changed to "Self-certification".

Electromagnetic Interference

We would contend that under the proposed re-qualification provisions, manufacturers would now have to resubmit their CFLs for FCC testing, which is very expensive. We contend that FCC testing should be exempt from the re-qualification provisions unless a CFL design changes sufficiently to warrant additional FCC testing as is already required by FCC Rules. We contend the FCC regulatory requirement provides sufficient protection for Energy Star customers.

Elevated Temperature Testing for Reflector CFLs

NEMA companies agree that additional measures are needed to ensure the quality of Energy Star rated R-CFLs. The proposal presented at the September 20 meeting, and included in the draft specification for elevated temperature testing, although technically sound for lab scale testing, is expensive, is not practical nor suited for large-scale life testing, and is not supported by any standards, either existing or in development.

Energy Star has historically referenced existing testing methods within the product specifications. These testing methods have undergone the proper technical review, the proper approval process, and allowed for the appropriate input and discussion at the highest technical level. Where there has been no existing test method, one has been developed that has gone through the proper channels, including those that were mentioned on Sept. 20 by NRDC (which

were far less technical). None of that has occurred here. The type of testing proposed in the draft is too premature to be included in such a well-respected program as Energy Star.

As we pledged at the Sept. 20 meeting, we are at work developing a counterproposal. However, given the short amount of time and the difficulty of the task, we are not yet satisfied that it meets the goals of practicality and effectiveness. In addition, we are mobilizing our resources to launch standards development efforts in the appropriate forums to underpin an elevated temperature testing scheme. Even though we have not yet resolved all of the technical issues that we ourselves have identified, in an attached annex we have included for the benefit of all stakeholders the status of our current proposal-in-development.

That said, any proposals for elevated temperature testing should be left out of the specification until protocols we have committed to develop are in place to support the elevated temperature testing. During this period, the version 3.0 reflector CFL requirements should be retained, or we will risk eliminating highly efficient (compared to standard incandescent or halogen reflectors) lamp types from the market.

Further arguments for eliminating these test requirements are derived from the recent Energy Star testing of reflector products as reported by DOE. Thirty-two failures of 54 lamp types indicate that the CFL industry has not yet met all the targets for reflector lamps under the version 3.0 requirements. Bringing in new non-standard requirements on this product family will once again risk eliminating highly efficient (compared to standard incandescent or halogen reflectors) lamp types from the market, affecting the credibility of the Energy Star brand.

Qualification

For reasons of practicality, we propose increasing the 45-day period under Item 7 (B) Step 2: Full Qualification to 60 days for reasons of practicality. We propose an identical change for Item 8 (B) Step 2 for R-CFLs.

Disqualification Appeals Process

For reasons of practicality, we propose that the 30-day timeframe referenced in section 13.A, items 1, 3, and 4; and in section 13B, be changed to 45 days.

Re-qualification

A striking change in the proposed criteria is that current Energy Star qualified product would have to meet the new standard only a few months after it goes into effect. This is a big change from past practice and one that does not respect the investments made by manufacturers in developing these products.

Further, there are many products in the “development pipeline”, and capital investments have already been made for these products. Under the proposed specification, these pipeline products could be qualified and introduced in the next year then be disqualified only a few months later.

This is among the most grievously felt of the changes in the proposed specification and does not reflect the realities of the development, manufacturing, and marketing arenas. If we are really to be Energy Star Partners, and we emphasize Partners, we will have to have a specification that reflects the costly business we are in, and that lets us recover our investments.

We find that the proposed 36-month period for re-qualification of products that are fully qualified under the new provisions of the final Spec 4.0 is reasonable, since the 36-month period starts only upon completion of the final average rated life test.

However, we contend that the proposed six-month window for re-qualification of existing, qualified products is not acceptable. This is especially true for products currently being engineered under the version 3.0 requirements and moving towards launch. The new specification will likely incorporate some very significantly increased requirements that will require additional effort and resources by the manufacturers to modify or redesign these products to comply with the new requirements, especially for manufacturers that have invested in developing a broad product range.

To cover the transition needs we propose two additional re-qualification cases:

Case A

If the initial qualification date of the product was more than 36 months prior to the Effective Date of the version 4.0 specification, then that product must be re-qualified by the Effective Date + 12 months.

Case B

If the initial qualification data of the product was less than 36 months prior to the effective date of the version 4.0 specification, then that product must be re-qualified by the initial qualification date + 48 months

This proposal is meant to ensure that a manufacturer who has developed a product in good faith can recoup a minimum of 3 years of Energy Star listing before needing to program the resources and incur the expense and effort to re-qualify it.

Independent Third Party Testing

We believe DOE has attempted to address our earlier expressed concerns. However, we have several issues with the proposed membership criteria for the Product Selection and Technical/Research Committees, the product nomination and selection process, and access to testing data reports.

Committee membership allocation

With respect to both the Product Selection Committee and the Technical and Research Committees, we make the following observations:

In the case of the Product Selection Committee, only one of 4 members is from industry, and there appears to be only a 1 in 3 chance that this industry person would be from a lamp manufacturer. Under the current proposal, it is possible to have no manufacturer represented in any given one-year selection cycle. We think this is not at all consistent with the funding mechanism, which calls for manufacturing Partners to pay the entire bill. Why wouldn't the Energy Star administration take steps to assure that lamp manufacturers are part of this group? We think the current proposal is out of line with the experience lamp manufacturers bring to the discussions, and with the funding structure of this third party testing.

We propose that lamp manufacturers be assured of at least one position on the committee, and preferably two. We further propose that no more than one testing laboratory be a member of the committee at any given time due to the potential conflict of interest, as pointed out in the Sept. 20 meeting. Nominations should also be openly solicited at a specific point in each year for the next cycle.

In addition, opening the product selection committee to testing laboratories presents a conflict of interest for those laboratories that are being paid to conduct testing on the lamps. We recommend that Energy Star prohibit testing laboratories from being part of this committee.

In the case of the Technical and Research Committee, there is no assurance that lamp manufacturers will be represented in this group at all. How was this decided? Whose input does this reflect? Was this proposed by other stakeholder groups? What was their rationale?

We find it incomprehensible that there is no requirement that a Technical and Research Committee member is technically proficient in CFL design, measurement testing, or statistics. We find it unacceptable that retailers are viewed as equivalent to product manufacturers on this committee.

We propose that a more credible mix of members would be: of the 6 member slots, lamp manufacturers should have at least 3 positions reserved, with 2 positions being reserved for test laboratories (which could include LRC, ETL, etc.), and 1 reserved for other parties. This committee should also have the ability to accept other ad hoc members for special tasks if warranted. We also believe that 12 months is too short a period for a technical committee and would prefer to see 18 months with provisions to extend membership if conditions or tasks warrant.

In addition, opening the product selection committee to testing laboratories presents a conflict of interest for those laboratories that are being paid to conduct testing on the lamps. We recommend that Energy Star prohibit testing laboratories from being part of this committee.

Furthermore, it is unclear as to how often a representative can serve on a committee, and whether there is a minimum time requirement before he/she can be considered again to serve. If a representative is elected to one committee, does that preclude his/her company from being represented on the other committee? Who will make the final determination, and what are the criteria by which these positions will be filled?

Product nomination and selection

As we understand the nomination process, the testing pool would comprise all qualified CFLs, with multiple SKUs of a particular technical model counting multiple times. We prefer defining the testing pool as the number of different technical models in the market. As we understood Energy Star at the September 20 meeting, this was acceptable to them. While the proposed change may seem small, it prevents a manufacturer with many SKUs but very few unique technical models from having an elevated probability of selection for the random product testing.

Rather than eliminate all SKUs after a product is selected for testing, based on all qualified CFLs, we recommend limiting the potential product pool to distinct model types at the beginning of the process. This will cut down on both confusion and administration.

Testing review process

This section states “Based on the results and incorporation of measurement tolerances...” It is our understanding that the technical committee was designated to discuss these measurement tolerances. Does that mean that the committee will need to resolve this issue prior to any testing being undertaken? Please clarify “measurement tolerances” if this is not the intent.

Access to data reports

It is our understanding that the Third Party Testing Process:

- Is a completely separate and independent activity from the ENERGY STAR certification process;
- Is to be operated under a separate contract between the manufacturers, the testing laboratories and the Third Party Testing Administrator;
- Is in no way connected to the existing or future contracts administered by the US Department of Energy for the ENERGY STAR CFL program;
- May – by decision or coincidence – hire the same organization or company for administrative tasks as DOE has hired as a contractor for the ENERGY STAR CFL program; if this is the case, it is assumed that complete confidentiality be upheld within the organization or company and that no information is shared with members of the organization or company by the Third Party Testing Administrator (TPTA);
- Is funded solely by non governmental funds, and thereby is not obligated to adhere to requirements of public access to deliverables;

- Provides testing results that are the ownership of all the participating manufacturers, who agree to confidentially share this information only with the TPTA and the U.S. DOE for the purposes of quality insurance, brand integrity, and trend data development.

Therefore, we are concerned about the sentiment raised at the September 20th meeting that others should receive these reports without charge. We feel that non-Partners, including other Energy Star stakeholders who are not funding the testing program, should pay for these reports. While the money exchanged may or may not be large, depending on the fee structure, we see this as a basic “fairness” consideration. Our preference is that the report fees be substantial to prevent the abuse of the distribution system and to help spread the costs among those standing to benefit the most. NEMA companies are in complete disagreement with the statement by one of the non-manufacturing stakeholders at the Sept. 20 meeting that “manufacturers gain the most from the Energy Star program.”. All Partners benefit equally from this program, as market transformation activities cannot be effective and successful without available products to sell, and vice versa.

Do we understand correctly that under the version 4.0 proposal that manufacturers who are not Partners would also have free access to these reports according to the proposed specification? If this is the case, we think this needs to be changed; like the other non-Partners, these manufacturers surely should pay for the product trend reports to which they do not contribute, and which do not include their own products.

Terminology

Given that it is likely that D&R International will be selected as the Independent Third Party Testing Administrator, it is imperative that this specification clearly state their role and responsibilities, and that the terminology be consistent to avoid confusion and/or potential legal issues.

As a contractor to the U.S. Department of Energy, D&R International is authorized to undertake various activities, and restricted from undertaking inherently governmental work. In this capacity, they are called the “Energy Star Contractor.”

As it is written in the draft version 4.0 specification, however, the Independent Third Party Testing Administrator is alternatively called the “Program Manager” and “Program Administrator.” The term “program manager” may likely be confused with “program contractor,” and we recommend that the Independent Third Party Testing Administrator be consistently named throughout the specification, especially in Figure 3 of Appendix A.

Effective Date

The Energy Policy Act of 2005 directs Energy Star to allow for 270 days from finalization of a revised specification to the effective date to provide appropriate lead time, taking into account timing requirements of product manufacturing, marketing and distribution. We propose Energy Star take this a step further and set the effective date as 12 months after publication of the

finalized specification. Manufacturers must know with a high level of certainty what requirements must be incorporated in engineering design programs.

Other Issues

Data submission

We trust that DOE has an ICR (Information Collection Request) in place that allows them to request test data and shipment data. We would like assurance from DOE that this is in place. In addition, DOE was helpful in pursuing the question of confidential business information and assuring that it will not be subject to the FOIA process. However, we would like to have on hand an official response on DOE letterhead from the DOE legal department for future protection.

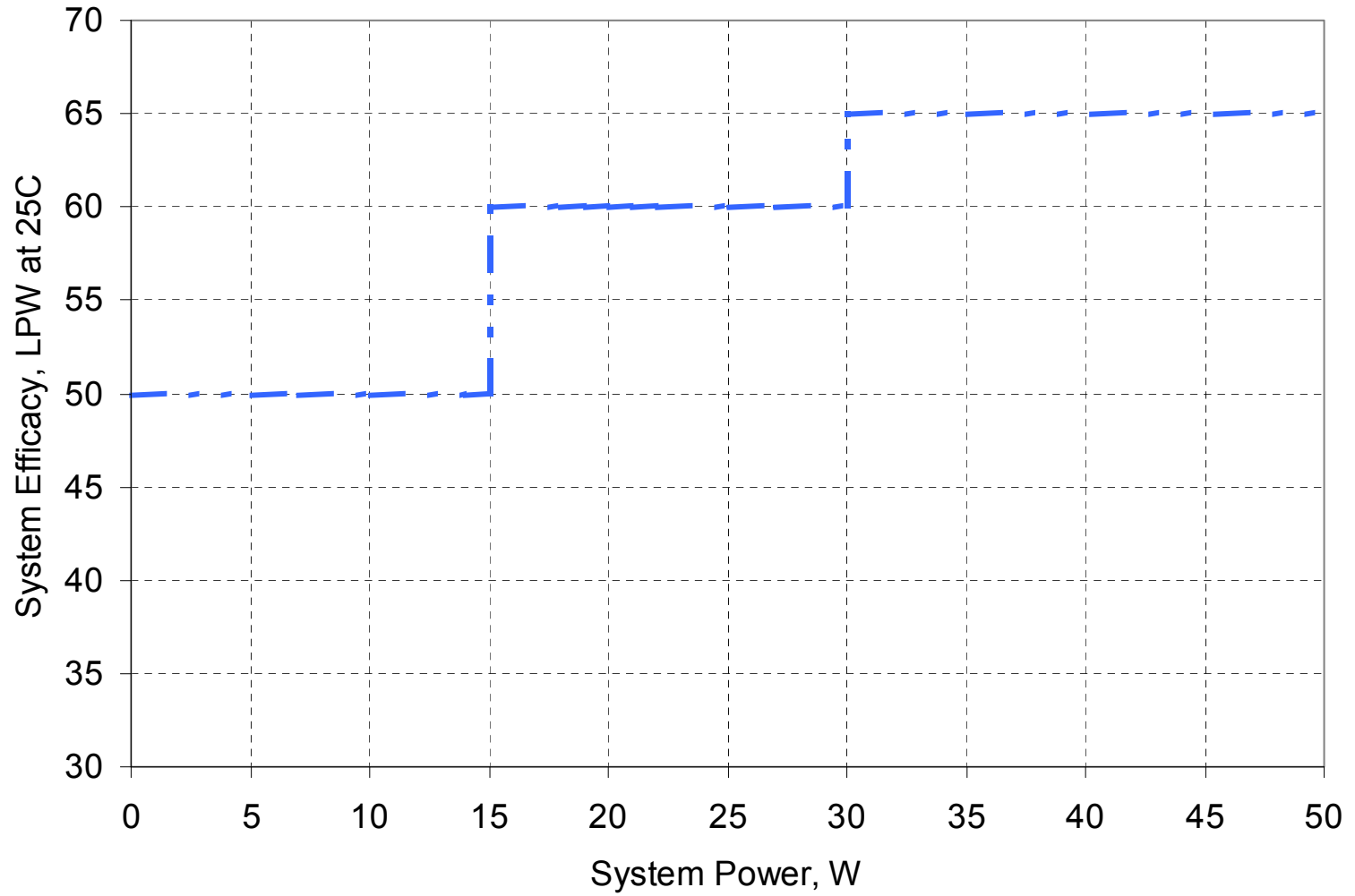
Independent audit of Third Party Testing process

At the Sept. 20 meeting, several efficiency partnership representatives raised the option of adding an independent audit process to this specification. It is our understanding that this random auditing of the testing process only would be conducted on lamps that were tested during a previous cycle and not while the testing was being conducted. While we have no objections to this, we feel that the third party testing process is already an accurate determination of compliance, and an independent auditing process would create a further financial burden. We would agree to this process, if those who are requesting it – the efficiency partnerships – funded it. The Energy Star program is a partnership, which does not mean that one side should be expected to shoulder an inequitable financial burden.

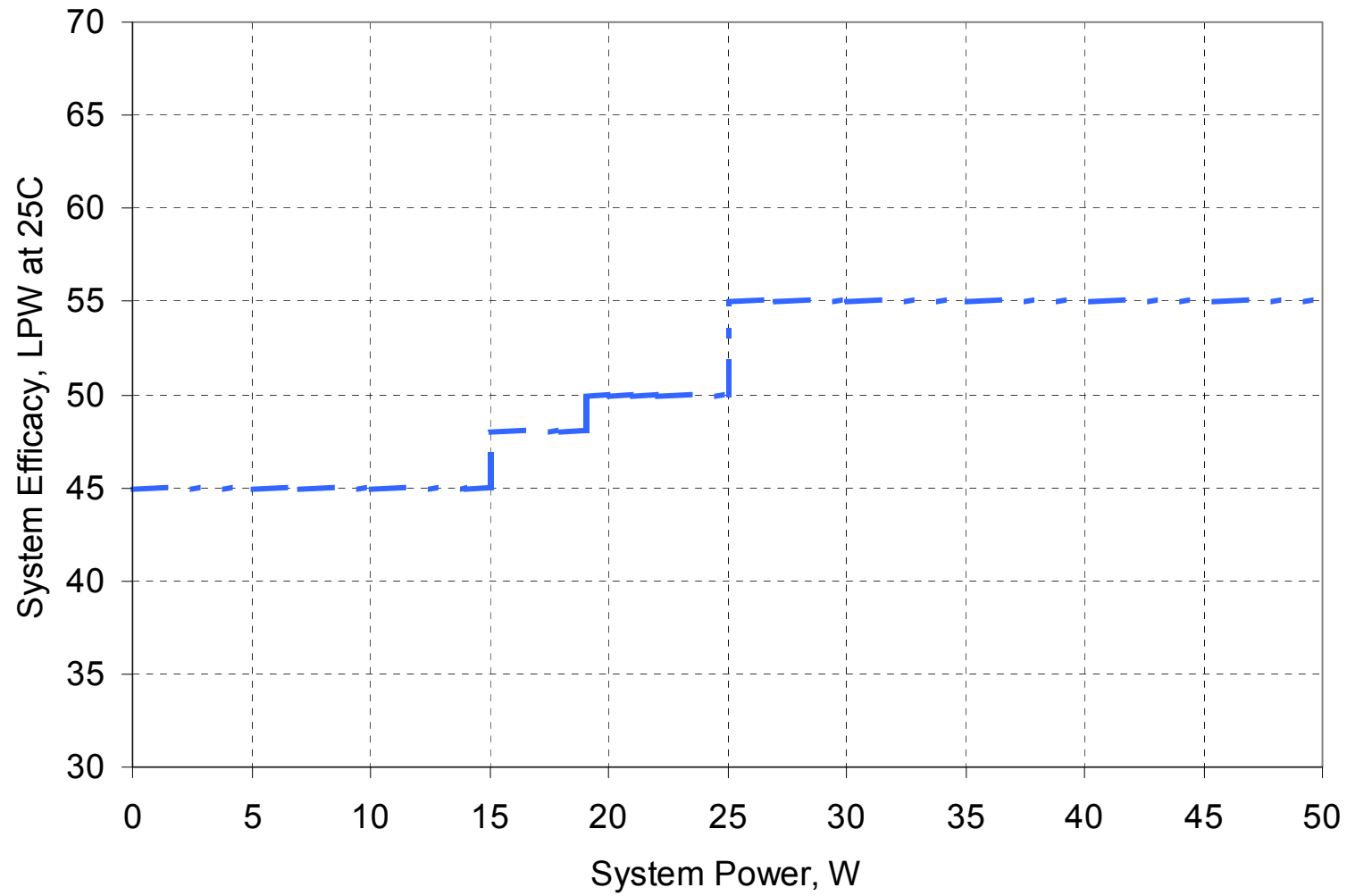
Thank you for the opportunity to provide these comments. We look forward to working with Energy Star and other partners toward a final Version version 4.0 specification that seeks to drive consumer adoption of CFLs without simultaneously pushing this energy saving technology further out of their reach.

END MAIN TEXT OF DRAFT COMMENTS

Proposed LPW Limits for Bare, Non-dimmable CFL Lamps



Proposed LPW Limits for Covered, Non-dimmable CFL Lamps



Annex**Technical Proposal-in-Development****Elevated Temperature Tests****Section 5A****Initial Elevated Temperature Light Output****Overview**

In the current draft, the product is required to maintain at least 90% of its initial rated light output when operated in a nominal ICAT downlight in the UL 1598 thermal test apparatus.

Proposal

The requirement is proposed to be amended as follows:

The relative light output of the product as measured at an ambient temperature of 50C, will not be less than 80% of the light output measured at 25C. The test must be performed according the test procedure in section 5D.

Sample size to be 1 unit per model.

The Laboratory Requirement is “Self-certification”

Rationale

The intent of the draft requirement is that the product maintain at least 90% of its luminous flux, as measured at 25C, at a higher, but unspecified, temperature in an ICAT downlight from an unspecified manufacturer.

The ambiguities in the current specification make it difficult to conceive how the results of this measurement are repeatable between different laboratories. Lab A could have a ICAT downlight from manufacturer B, while the downlight used in lab B is from manufacturer C and has a different thermal profile.

The proposal improves upon the present specification by providing a fixed ambient temperature at which to make the measurement. The required performance vs temperature data are typically gathered by the manufacturer during the product development process using equipment and test set-ups already available.

Section 5A**Elevated Temperature 1000-hour Lumen Maintenance****Overview**

The current draft keeps the lumen maintenance requirement from the version 3.0 specification of 90% at 1000 hours. A new limit has been added that no more than 2 lamps may be below 85% maintenance. In addition, testing is prescribed to take place at an ambient temperature of 55C.

Proposal

The requirement is proposed to be amended as follows:

Average lumen output measurement of the 10 lamps tested must be greater than 85.0% of initial (100 hour) lumen output @ 1,000 hours of life. Samples must be aged in the Elevated Temperature Test Apparatus as described in section 5E.

Sample size unchanged.

The Laboratory Requirement is unchanged. The date of October 1, 2006 would be changed to reflect a date when and agreed upon protocol is in place.

Rationale

The elevated temperature testing proposed in the existing draft is new to the industry. While the maintenance at elevated temperatures is generally known to be poorer than at room temperature, the exact effect of the elevated temperatures used in this test on the lumen maintenance of reflector CFLs is unknown. Therefore, it is proposed that the criteria be reduced from 90% to 85%.

Section 5A**Elevated Temperature Lumen Maintenance at 40% of Rated Life****Overview**

The current draft keeps the lumen maintenance requirement from the version 3.0 specification of 80% at 40% of rated life. A new limit has been added that no more than 2 lamps may be below 75% maintenance. In addition, testing is prescribed to take place at an ambient temperature of 55C.

Proposal

The requirement is proposed to be amended as follows:

Average lumen output measurement of the 10 lamps tested must be greater than 75.0% of initial (100 hour) lumen output @ 40% of rated life. Samples must be aged in the Elevated Temperature Test Apparatus as described in section 5E.

Sample size unchanged.

The Laboratory Requirement is unchanged.

Rationale

The elevated temperature testing proposed in the existing draft is new to the industry. While the maintenance at elevated temperatures is generally known to be poorer than at room temperature, the exact effect of the elevated temperatures used in this test on the lumen maintenance of reflector CFLs is unknown. Therefore, it is proposed that the criteria be reduced from 90% to 85%.

Section 5C

Elevated Interim Life Test

Overview

In the current draft, samples are required to be tested at $55^{\circ}\text{C} \pm 5^{\circ}\text{C}$ in the lifetest apparatus described in Section 5E. In addition, the test may be performed in a non-NVLAP accredited laboratory if testing is initiated prior to October 1, 2006.

Proposal

The requirement is proposed to be amended as follows:

The requirement to test at 55C will be removed.

The date of October 1, 2006 would be changed to reflect a date when and agreed upon protocol is in place.

Rationale

The current draft requires manufacturers to warrant the product for operation at 50C, not 55C. This change is requested to make the temperature requirement consistent throughout the document. In addition, there is a new proposed lifetest procedure in Section 5E which may conflict with a requirement to operate the lamp at a specified temperature.

Section 5C

Elevated Temperature Life Testing for Reflector Products (Final qualification)

Overview

The proposed draft requires a minimum life of 6,000 hours for reflector products, which remains unchanged from the version 3.0 specification.

Proposal

The requirement is proposed to be amended as follows:

Life will be = 4,000 hours as declared by the manufacturer.

Rationale

The current proposed life of 6,000 hours remains unchanged from version 3.0, however, the conditions under which the lamp is required to operate are more severe. In version 3.0, life was measured under operation at 25C in an open socket arrangement. The draft version 4.0 requires the following:

- Lamp life testing occurs at an elevated temperature, around 50C.
- The manufacturer is required to warrant the reflector product at minimum temperature of 50°C

The performance of products designed to existing, or previous Energy Star specifications is unknown under these conditions as the life of some components degrades rapidly at higher temperatures. This uncertainty also represents a large potential warranty cost.

Section 5D

Initial Elevated Temperature Light Output Testing Procedure

Overview

In the current draft of this light output testing procedure, a seasoned sample is operated in an nominal ICAT downlight until it stabilizes. An illuminance reading is taken and then insulation is placed around the downlight. The sample is allowed to restabilize and another illuminance reading is taken. The two illuminance values are ratioed to determine the light output with insulation surrounding the downlight to the case without insulation.

Proposal

The requirement is proposed to be changed as follows:

Minimum Equipment required:

- Thermal chamber
- Illuminance meter
- AC Power Supply
- Controlled draft enclosure
- VAW meter
- Type J or K thermocouple
- Thermocouple meter

Test Procedure:

1. Prior to testing, the sample shall be seasoned to 100 hr.
2. Situate the controlled draft enclosure in the thermal chamber. The controlled draft enclosure shall limit the draft across the lamp to 0.08m/s (15 ft./min) as suggested by IESNA LM41-98 when placed in the thermal chamber.
3. Locate a shielded, test point thermocouple such that it is 1" below the base of the lamp and 2" from base of the lamp toward the enclosure wall.
4. Install the lamp in the enclosure.
5. Apply the rated lamp voltage while operating the thermal chamber such that the temperature at the test point is stable at 25°C for 15 min as determined by 3 measurements 5 minutes apart within 1°C
6. At this point, the lamp shall be stabilized per LM-41-98, Sec 5.4 for compact fluorescent lamps or the manufacturer's recommended stabilization time.
7. Record the level of the relative light output of the lamp, the input electrical values and the test point temperature at nominal 25°C.
8. Repeat steps 5 thru 7 at 50°C.
9. Reduce the temperature to 25°C and shutdown the system as required.

Rationale

The draft test procedure essentially measures the difference in light output for the lamp operating in a fixture without insulation (at a temperature greater than 25C) to the light output

with insulation. A “nominal” ICAT downlight is to be used for the measurement, but no definition of “nominal” is provided.

The intent of the draft requirement is to define a thermal factor for the light output at elevated temperature relative to that at 25C.

The proposed procedure follows the intent of the draft requirement and provides a more consistent method to gather the data.

Section 5E

Elevated Temperature Testing Procedure

Overview

The current draft requires the construction of a custom built lifetest rack. The rack is to maintain the samples at an ambient temperature of 55C ± 5°C during life. In this environment, a baseline illuminance reading, and readings at 1000 hrs and 40% of life would be taken to determine lumen maintenance.

Proposal

Lifetest the reflector CFL products using a commercially available ICAT downlight. Manufacturers need to select up to 3 acceptable models which can be put out for bid by DOE or program contractor. The selected fixture will then be used for lifetesting by all interested laboratories. Criteria for fixture selection:

- Availability
- 6” diameter, 8” deep cavity
- Thermal performance when compared to proposed custom built test rack. This testing may require the assistance of PNNL.
- Thermal performance when compared to UL box without the lens. The lifetest fixture should not present a more severe thermal environment than the UL 1993 thermal test.

Test Procedure:

- Season 10 lamps to 100 hrs base-up in open air according to the appropriate IESNA procedure.
- Photometer lamps BU at 100hr. These could be the same lamps to determine lamp efficacy.
- Age lamps to 1000 hrs in the ICAT lifetest racks
- Remove lamps and photometer in the same manner as 100 hrs.
- Return lamps to ICAT lifetest racks.
- Age lamps to 40% of rated life.
- Remove lamps and photometer in the same manner as 100 hrs.
- Return lamps to ICAT lifetest racks.
- Continue testing until all lamps fail, or until rated life is achieved, whichever comes first.

Lifetest conditions shall comply with IESNA LM-65-2001.

Rationale

The test apparatus as illustrated in the current draft must be custom built. At present, no drawings or electrical schematics are available to construct an exact duplicate. A description of its construction is available, but it allows sufficient flexibility, for example in socket spacing, that results from lab to lab could differ significantly. Also, during the Stakeholder meeting on 9/13/05 it was stated an incandescent lamp is used to replace a failed CFL in order to maintain the temperature.

Standardizing on a commercially available downlight will minimize variation. Choosing an ICAT fixture will thermally insulate the lamps from one another. (We believe that heating effects from neighboring luminaires would not be an important consideration.) Instead of maintaining the lamps at a collective 55C, the lamps will reach thermal equilibrium via self-heating of their respective luminaires. This means that lower wattage lamps, which would operate at lower temperatures in actual field use, would not be penalized by operating at too high a temperature. Similarly, higher wattage lamps would not benefit from operation at artificially low temperatures.

In the current draft, lumen maintenance of reflector lamps is characterized by measuring the illuminance directly below the lamp at various points in life. This method is highly sensitive to illuminance sensor placement. The proposed method reduces this uncertainty by following standard photometric procedures and measuring the lamps in an integrating sphere.