Setting Standards for Excellence

October 12, 2004

To: David Schiller, EPA/Energy Star
Paul Vrabel, ICF, Consulting for Energy Star

Re: NEMA Comments on First Draft of Proposed Changes to Energy Star RLF Specification

From: NEMA Ballast, Lamp and Luminaire Sections

Thank you for the opportunity to comment on the first draft (dated September 13, 2004) of proposed changes to the technical specification and program criteria for Energy Star-qualified Residential Light Fixtures. We appreciate the consultations we have had with Energy Star prior to the release of this draft. At your request, our comments below reiterate the input and feedback we offered during those discussions. As the proposals have changed somewhat and we have had more time to examine them, we have additional comments as well. In short, there are a number of areas we believe must be improved before a second draft is issued to Energy Star stakeholders. We address these areas below; in the order they are raised in the proposed version 4.0, not in order of importance.

Section 1: Definitions

C. Compact Fluorescent Lamp: A single based fluorescent lamp with a plug-in lamp base and lamp holder or socket configuration that includes multi-tube, multibend, spiral, and circline types.

(Rationale- brings definition more into line with terminology used in standards for CFLs.)

D. Linear Fluorescent Lamp: Straight shaped or U-bent double based lamps.

(Rationale- corrects definition: all lamps have two ends (are double ended). The distinction is whether they are single or double based, not single or double ended.)

G. Lamp Current Crest Factor:
- 60 Hz Operation: Ratio of peak current to the root mean square (RMS) lamp current.
- HF Operation: Ratio of the highest peak current of the modulation envelope (when evaluated over a full line voltage cycle) to the root mean square (RMS) of the lamp current.

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L. Standardized Color Ellipse: Objective chromaticities (x,y) specified in Table 1 of ANSI C78.376-2001

M. Color Centroid: Not required (see other NEMA comments)

Section 2: Qualifying Products

Magnetic Ballasts (p.3)

We agree to the elimination of magnetic ballasts from all indoor fixtures and from outdoor fixtures save those that use high intensity discharge (HID) lamps.

Section 3: Energy-Efficiency Specifications for Qualifying Products

Table 1 – Indoor Fixtures

Combined Lamp and Ballast Requirements

System Efficacy (p.4)

We note that the draft as written should exclude indoor use of PAR HID systems . PAR HID systems should be allowed since they are considerably more efficient than incandescent lamps, especially in applications such as high ceiling foyers or entrance ways where the optics of an HID PAR yield much better effective beam efficacy than CFL technology.

For the next revision of the Requirements we think it is sufficient to exclude PAR HID systems from any minimum efficiency requirements and to allow such products to be covered as an emerging technology.

Fluorescent Lamp Requirements

Lumen Maintenance (p.5)

We understand that inclusion of a lamp lumen maintenance requirement is not a response to any evidence or data from the RLF program indicating that lamp lumen maintenance is currently an issue. Since that is the case, and since light depreciation over time from a residential fixture can also be the result of factors not limited to the lamp (such as dirt depreciation and changing lens characteristics), we believe that a lamp lumen maintenance requirement should not add undue burden, especially since there is no Energy Star Lamp program except for the screw-based Compact Fluorescent Lamp Energy Star program.

A minimum requirement of 80% is acceptable for straight shaped linear fluorescent lamps and compact fluorescent lamps. However, for circline fluorescent lamps the minimum lamp lumen

maintenance requirement needs to be amended to 70% since the bending process for such lamps results in changes to the lamp phosphor coating that reduce the lumen maintenance for such configurations. Since circline fluorescent systems are still very efficient compared to incandescent lamps, and since 70% maintenance has proven historically acceptable over decades of use, primarily in residential applications, such a requirement is justified.

This requirement should be addressed through adding a lumen maintenance column to the NEMA-ALA Lamp Matrix, with the stipulation that the lumen maintenance for a listed lamp be displayed in that column and calculated from the quotient of mean rated lumens (at 40% rated lamp life) divided by mean initial lumens for each listed lamp model. All listed lamps would need to meet the 80% requirement with the exception of circline models, which would need to meet 70%.

We note that the lumen maintenance requirement for Energy Star Self Ballasted CFLs (which is 80% at 40% rated life) is contained in ANSI C78.5.and that there is currently no ANSI standard which establishes a minimum lumen maintenance requirement for linear fluorescent lamps.

Correlated Color Temperature (p. 6)

Currently the only Energy Star color requirement pertains to the CFL Energy Star Program and is intended to apply to self-ballasted compact fluorescent lamps.

We have previously interacted with both DOE and EPA on the subject of color uniformity requirements and have stated that we agree that the current CFL Energy Star color specification is no longer adequate for the CFL Energy Star Program. We also agree that improved color requirement should be based on discrete color regions, as proposed in the Draft Energy Star Requirements for Residential Light Fixtures. However, after carefully considering the proposed draft requirement for Correlated Color Temperature in its entirety, we find some aspects of the draft proposal too complicated to be practical, and therefore cannot accept it fully.

We offer an alternative that meets both the intent of the Draft proposal and that, based on our experience as lamp manufacturers, is more practical to implement. As a result, it would prove less burdensome for manufacturers. Furthermore, our proposed alternative would be more effective in ensuring improved color uniformity.

The CCT requirement proposed in the Draft would require lamp manufacturers to compile ongoing quality control color data against a complicated ‘two ellipse’ method that is not employed today. The new CCT requirement should be amenable to using *existing* quality control, assessment, and data tracking procedures that are already integrated into practical manufacturing processes. We also find the ‘two ellipse’ implementation method fundamentally confusing and very complicated to implement in practice. In addition, an analysis of the Draft ‘two ellipse’ proposal reveals that it actually would unintentionally allow a discrete color space that could potentially allow 9 steps of color variation, which we believe is excessive.

We propose the following alternative for a greatly improved color requirement that would be applicable to both Energy Star Programs and that meets the fundamental objective of improving color uniformity:

1. The CCT requirement should be based on discrete colors, where the color objectives (x,y) values are found in Table 1 (Objective Chromaticities) contained in ANSI C78.376. for currently standardized colors. In addition, we propose the addition of several new colors that will be standardized in the future.

   Discrete color spaces allow for the forward looking development of an expanded color palette, which is an intrinsic benefit of fluorescent lamp technology, while establishing a clearly defined color objective for each designated color. The ANSI fluorescent lamp standards committee has currently defined and published color objectives for the following nominal color designations: 2700K, 3000K, 3500K, 4100K, 5000K, and 6500K. While we believe that these standardized color objectives (and an associated tolerance region, to be described later) should be the basis for a color requirement, we propose two additional colors (2800K and 2900K) in order to incorporate existing products within the 2700-3000K range and to allow for a more complete emulation of the CCT range that is associated with existing incandescent and halogen lamps. We also propose a third new color (2600K) that has, via preliminary market research, shown some promise as a color that some consumers feel more closely approximates some incandescent lamp types.

   Further, we propose that the CCT requirement for 2700K accommodate both the IEC 2700K region and the ANSI 2700K region, at least as an interim requirement. For 2700K the resultant color region would then be defined as the conjoined space established by the overlapping area of target ellipses based on both the ANSI and IEC (x,y) color objectives. The three new colors are positioned very close to the black body curve. The objective color chromaticity for each color region would be as follows:

CCT	X	Y	Comment
2600K	0.467	0.414	New color
2700K	0.459	0.412	ANSI 2700K chromaticity coordinates
2700K	0.463	0.420	IEC 2700K chromaticity coordinates
2800K	0.453	0.411	New color
2900K	0.444	0.405	New color
3000K	0.440	0.403	ANSI Warm White
3500K	0.411	0.393	ANSI White
4100K	0.380	0.380	ANSI Cool White
5000K	0.346	0.359	ANSI Un-named color
6500K	0.313	0.337	ANSI Daylight

   Note: Attached in Figure 1 (page 14) are the preliminary graphical embodiments of the proposed color ellipse spaces. We should discuss best way to display such requirements in the final version of RLF 4.0. We suggest that in addition to the (x,y) points above, each color also include a graphical ellipse and the mathematical ellipse parameters that define the ellipse as is provided in ANSI C78.376.

Additional rationales for these additional chromaticity objectives are as follows:

Conjoined ANSI-IEC 2700K Space

Currently, there is a slight difference between the ANSI and IEC chromaticity objectives for 2700K. Until this can be resolved, we believe that a conjoined space should be allowed (but only for 2700K). Since this conjoined space will still be a significant improvement over what is permitted today, there is no significant risk to the program, only improvement. There is no specific evidence of which we are aware that such an improvement would not be acceptable, particularly on an interim bases. Whether further restriction of the 2700K space to only the ANSI objective is required should be determined on the basis of subsequent evaluation and research involving consumers, which we are eager to see proceed.

2800K, 2900K Color Spaces

Currently incandescent and halogen sources span the 2700-3000K CCT range, which includes the intervening region between these two chromaticity designations. Since some manufacturers make lamps at 2800 and 2900K, and since these lamps approximate the colors of some incandescent or halogen lamps that consumers already use, there is no risk to the program in permitting these colors since each designated color will have an associated discrete color region. This is a vast improvement over the current Energy Star CFL color requirement which essentially treats all lamps in the 2700-3000K region as the 'same color', which is clearly not the case, and can result in possible color dissatisfaction.

2600K Color Space

Although preliminary, some research indicates that some consumers prefer 2600K as a better approximation for some incandescent lamps. Including this color would allow this exploration to continue under the Energy Star Program.

2. The defined discrete color spaces for each designated color should be based on a single Mac Adam ellipse. Experienced lamp manufacturers have historically used a single ellipse against which to evaluate and maintain manufacturing process control for a designated color, and it would be overly burdensome to require that such established color control and quality control practices be totally changed with no compelling evidence that such a change is necessary to achieve the objectives of the program. Additionally, it will be much easier for both Energy Star programs to assess improvements in color control using a single ellipse for each designated color. Thus a single ellipse approach is simpler to understand, implement, assess, and enforce. We contend that the industry should be given the chance to implement requirements that are based on historically accepted practices for color control.

3. The defined discrete color spaces for designated colors should be generated by creating a seven step Mac Adam ellipse mathematically derived from the specified designated (x,y)

chromaticity coordinates. The intent of these spaces would be to represent the region that would contain approximately 90% of the ongoing production for lamp models that are designated to have the corresponding designated color. In addition to the practical considerations discussed earlier, a color region based on a single seven step ellipse represents a smaller potential color variation among lamps from the same manufacturer, and, more importantly, among lamps designated with the same CCT across manufacturers, than the 'two ellipse' approach proposed in the Draft requirements. The 'two ellipse' approach can inadvertently result in what is essentially a 9 step based color space.

4. NEMA has previously shared with EPA (and DOE) the basis for seven step ellipses, which are required to accommodate the practical variations in color that particularly result from compact lamp (self ballasted and plug in) configurations—i.e., covered, uncovered, clear color, coated, amalgam, non amalgam, etc. Since a seven step approach is more restrictive than the Residential Fixture Draft proposed color requirements, is significantly more restrictive than the current Energy Star CFL CCT requirement, and establishes a CCT requirement for the Residential Fixture Program where there is currently no such requirement, we strongly urge that our proposal be adopted and its results assessed. We look forward to working with EPA on developing any details needed to implement it in RLFV4.0 such as how best to incorporate the derived seven step ellipse regions into the requirements.

5. Thus, the complete Requirement for Correlated Color Temperature would read as follows:

"For lamps indicated on the fixture or shipped with the fixtures, the lamps must have a designated correlated color temperature (CCT) of one of the following: 2600K, 2700K, 2800K, 2900K, 3000K, 3500K, 4100K, 5000K, or 6500K.

(Note: Other colors may be added in future editions of the Program.)

It is also intended that the lamp manufacturer will meet the following color control requirements during the production runs of each lamp model:

A. The lamp manufacturer is required to maintain color control such that approximately 90% 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 into the 7 step Mac Adam color ellipse associated with the designated (manufacturer declared) target color.

B. For the purposes of meeting color control the 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 request of the Program.

C. 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 7 step color ellipse and available for review at least on a quarterly basis
d. Records that substantiate that approximately 90% of the (x,y) data points fall within the applicable seven step Mac Adam ellipse. Manufacturers are encouraged to exceed this target and may receive special distinction from the Program if they do so."

Elimination of the Warm and Cool Designations

We propose that the requirement to designate colors that fall outside the 2700-3000K range as either 'warm' or 'cool' be eliminated. We believe there is no inherent understanding by consumers of these terms, and their use can therefore be confusing. We would prefer to work as an industry and with EPA, DOE, and LRC, to develop color education programs that are based on designated and declared color nomenclature rather than to use terms such as 'warm' or 'cool'. Since this is work in progress, we believe the only immediately viable nomenclature is the already developed nominal CCT approach. Using CCT allows both Energy Star Programs to advance in the short term while we cooperatively investigate other possible alternatives. We note that given the proper education, consumers have learned to use other seemingly technical designations (such as ASA for photographic film speed and kWH for energy consumption) without fully comprehending their technical basis.

Final Comments on Color Requirements and Perceived Color Uniformity

As we have indicated on prior occasions, color is a complex subject. The eventual perception of color by a consumer for either a self ballasted CFL or a residential fixture is determined by a number of aspects that lamp manufacturers cannot control, so it is unreasonable increase the burden on lamp manufacturers beyond what we have proposed.

Such key color aspects include personal color sensitivity and preferences, the aesthetic or 'design' orientation of the consumer, cultural preferences for warmer or cooler colors, color appearance (and variation) introduced by the luminaire (cover, shade, or lens material), ambient temperature, dimming, lamp orientation, texture and color of background materials, and physical proximity to other lamps or luminaires in the same environment.

Today the Energy Star (CFL) Program requires colors to either be 'between 2700-3000K' or, if above or below '2700-3000K', to be labeled as either 'warm or cool'. This spec is now inadequate. Many more CFL Partners can now result in 'between manufacturer' and 'within manufacturer' color variation that are excessive when considered against such general requirements.

An improved Energy Star Color specification needs to reduce the overall variation allowed, be practical and not overly burdensome, be based on defined discrete color spaces, employ a nomenclature to designate 'colors' so end users can seek out or avoid colors that they like, dislike, wish to match, or wish to avoid intermingling in the same environment. Initially, as proposed, these colors can be designated by their unique nominal CCT values, but perhaps

future requirements will employ both CCT and a more 'user friendly' designation scheme yet to be developed.

Our proposed color requirement solves immediate deficiencies with the current Energy Star CFL color requirement as well as practical issues with the version proposed in the RLF 4.0 Draft. It will eliminate the serious color variation that is possible today and looks forward (is amenable to) an expanded array of colors in the future. It is practical to implement—but may require some partners to upgrade their color control procedures to achieve the proposed requirements. This proposal provides a basis for tracking future progress in improving color uniformity and allows an assessment based on much more data, since it would be overly burdensome and costly to measure the lamps needed to obtain statistical significance via third party testing.

Color and efficacy performance are interdependent variables. There is no evidence to suggest that color spaces more restrictive than 7 step Mac Adam based ellipses are necessary to avoid customer dissatisfaction. We urge both Energy Star Programs to adopt our proposal and review its success and whether further changes are appropriate 18-24 months after the implementation date. In the meantime we urge EPA to fund consumer research in the area of consumer color perception, work with the industry to devise color education that can be integrated into the Energy Star Program, and to also ensure that any information on reported color complaints are suitably documented in a manner that can drive specific actionable improvements if needed.

Electronic Fluorescent Ballast Requirements

Noise (p.8)

We understand from our discussions that this measurement is made of the ballast while inside the fixture. The proposed text should be changed to read: "Class A sound rating for the fixture. Not to exceed a measured level of 24 db, measured at a distance of 12 inches from the fixture."

Maximum Ballast Case Temperature (p.8)

NEMA does not agree to the proposal to reduce the maximum acceptable temperature from 90°C to 75°C. Energy Star has reported that it does not receive temperature data from all partners. We propose the following alternative text: "Not to exceed the ballast manufacturer recommended maximum ballast case temperature during normal operation inside a fixture. In the event that the ballast manufacturer does not provide the maximum ballast case temperature, then the maximum ballast case temperature will be 75°C."

End-of-Life Protection (p.8)

We agree that all electronic ballasts that operate T5 or smaller diameter lamps should contain an EOL protection circuit. However, the requirement to supply a circuit diagram is not practical and should be removed. This type of proprietary information is typically not shared manufacturer. IEC standard 61347-2-3 contains the EOL ballast requirements and should be referenced for RLF4.0. It

will be adopted soon as part of ANSI standard, C82.11, which is on schedule to be published in mid-2005.

Fixture Requirements

Replaceable Ballast (p. 10)

As we have discussed, including instructions for the consumer on how to replace the original ballast would void a luminaire's UL listing; thus, this requirement is not workable. Instead, we propose requiring inclusion of guidance on ballast replacement location and use by a qualified electrician.

Product Packaging for Consumer Awareness (p. 10)

The draft proposes that fixtures not shipped with lamps be required to include a statement on the product packaging listing of the lamp model used for Energy Star qualification testing. We understand this is aimed at ensuring a consumer finds and can purchase a lamp that keeps the fixture Energy Star-qualified.

The first issue with this is that there is no guarantee that the retailer or distributor carries the particular manufacturer model to be specified on the fixture package. Second, this creates opportunities for lamp and fixture partners to market one manufacturers lamp over others.

The draft also proposes that manufacturers could have the option of listing other models that would meet requirements. This could leave the manufacturer having a very long list of manufacturers and models on the packaging, something that is more likely to confuse the consumer than steer her to purchase an appropriate lamp.

In short, we do not believe that this requirement would accomplish your stated goal.

Instead, in the absence of an Energy Star lamp program (outside the screw-based CFL program), Energy Star should use the existing NEMA-ALA Lamp-Ballast Matrix to work more closely with retailers to direct consumers to lamps that allow the fixture to meet the Energy Star requirements. This approach is even more appropriate for building contractors, who can be directed to the Matrix website and who work with distributors who can match lamp to fixture.

The possibility of a paper or electronic cross-reference catalog for consumers in the retail environment should be discussed further. Such a resource would be based on the existing NEMA-ALA Lamp-Ballast Matrix.

Recessed Downlight Fixtures, IC-Rated (pp.10-11)

IC-Rated fixtures state so on the packaging and the UL label or other certifiers' marks is sufficient to confirm that.

Recessed Downlight Fixtures, AT-Rated (p. 11)

In the first paragraph, after "shall be sealed with a gasket or caulk", add "or certified/listed accessory". We believe this is consistent with the requirements of California Title 24, Section 117 on Mandatory Requirements for Joints and Other Openings ("Joints and other openings in the building envelope that are potential sources of air leakage shall be caulked, gasketed, weatherstripped, or otherwise sealed to limit infiltration and exfiltration.")

Table 2A – Outdoor Fixtures: Compliance Through Efficient Light Source

System Efficacy (12-13)

We understand the suggested LPW ratings are at 100 hours and not initial. Sixty LPW for lamps over 30 W listed is too high for lower wattage PAR lamps coming on the market (for example, a 39 W PAR 20 produces 51 LPW).

Lamp Life (p.13)

Our concerns are the same as above for indoor fixtures. In addition, some low wattage metal halide lamps coming on the market as replacements for PAR 38s do not meet 10,000 hrs (but reach 9,000).

Controls – Time of Day Sensor (p.14)

A definition of time-of-day-sensor should be added.

Replaceable Ballast (p.14)

As above, our concerns center on providing instructions to the consumer voiding a product's UL listing. Instructions to a qualified electrician are acceptable.

Table 2A – Special Application: Outdoor Fixtures Installed on a Sensor Controlled Circuit

As above, the requirement that a circuit recommendation be made is not workable and should be removed.

Table 2B – Outdoor Fixtures: Compliance Through Reduced Operating Time

Qualification Process, Acceptable Testing Facilities, Testing Standards & Required Documentation

We strongly question Energy Star's proposal to remove the allowance of third-party testing results from laboratories accredited by NVLAP's MRA signatory partners.

Section 4: Qualification Process, Testing Facilities, Standards & Documentation

Table 3 – Reference Standards and Required Documentation

Lamp Life (p.20)

The first sentence under "Required Documentation" should be modified to read:

"For fixtures that employ an integrated, not replaceable and non standardized ballast, laboratory test results must come from the specific lamp and ballast combination that will operate in the fixture. For fixtures that employ a lamp-ballast combination listed on the NEMA-ALA matrix, further life testing is not required."

With the number of lamp-ballast combinations, it is not realistic to require test results from "the specific lamp and ballast combination that will operate in the fixture". The NEMA-ALA Lamp-Ballast Matrix was developed to make it unnecessary for fixture manufacturers to do such testing for standardized lamps and ballasts . However, if a combination is not on the Matrix, then such testing should be required, particularly if the ballast is integrated into the fixture and is of a non-standardized nature.

The NEMA-ALA Lamp Matrix is open to non-NEMA companies. In addition, lamps and ballasts sold in the U.S. are required by the Federal Trade Commission to meet performance all claims.

The Note should be changed to read "The facility used for lamp life testing should either be accredited by NVLAP for lamp life testing or should be ISO9000 registered. For life testing facilities that do not employ IESNA LM-40 or LM-65, it will be acceptable to use IEC 60091 (linear lamps) or IEC 60901 (self ballasted lamps).

Since some lamp types come from international manufacturing facilities, life testing to IEC standards is appropriate. The on-off cycle specified in IEC (2 hours, 45 minutes on, 15 minutes off) is slightly different than the cycle specified in the IES LMs (3 hours on, 20 minutes off), but there is no significant difference in test results. Since both types of facilities have already invested in an equivalent test infrastructure, either set of standards is acceptable for life testing.

Lumen Maintenance (p.20)

We will consider adding a column for lumen maintenance to the NEMA-ALA Matrix as discussed previously. In addition this requirement should be changed to read- "Documentation must show the average maintained lamp lumens at 40% of rated life (4,000 hours) for a sample size of at least six lamps. Manufacturers test data is acceptable."

Although there will typically be data for more than 6 lamps, some existing data is based on 6 lamp samples, so this should be the minimum requirement. Lumen maintenance is determined by the fundamental design of the lamp (diameter, current level, phosphor loading, etc) and does not vary much with sample size. Six lamps is an adequate sample size for this parameter.

Correlated Color Temperature (p.21)

See our previous exhaustive comments on CCT. In addition, this section should read:

"Laboratory tests must be completed on the lamp shipped with the fixture or listed on product packaging for a sample size of at least ten lamps.

Provide:

For Initial Qualification

1. A test report from a NVLAP laboratory showing that the average of the 10 (x,y) coordinates lies within the declared 7 step Mac Adam ellipse when measured under reference lamp conditions and that at least 8 of the 10 (x,y) coordinate points for individual lamps lie within the same 7 step Mac Adam ellipse.

Upon Request to Verify Ongoing Production Color Control

2. A test report using manufacturers test data that substantiates that the lamp manufacturer is maintaining color control such that approximately 90% of the on going production (as represented by samples tested from each production shift for the same color and when typically evaluated over 12 month period) will fall into the 7 step Mac Adam color ellipse associated with the designated (manufacturer declared) target color.

3. For the purposes of meeting color control the manufacturer must maintain testing equipment calibrated to international practices and standards and must compile the color control data in a manner so that it can be easily reviewed upon request of the Program.

4. 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 7 step color ellipse and available for review at least on a quarterly basis
    d. Records that substantiate that approximately 90% of the (x,y) data points fall within the applicable seven step Mac Adam ellipse."

Noise (p.22)

We agree that no supplemental documentation should be required at the time of initial qualification. As above, we recommend that reference to "electromagnetic" and the text "in a room with ambient noise no greater than 20 dBA" be deleted. The proposed text should be changed to read: "Class A sound rating for the fixture. Not to exceed a measured level of 24 dBA (audible) when measured with a sound when measured with a sound meter (similar in performance to B&K type 2209) where the microphone is located 12 inches from the fixture in any direction."

Replaceable Ballast (p. 23)

The issue here is the same as with indoor fixtures: If a manufacturer directs a consumer how to replace the ballast, the manufacturer risks voiding the UL certification of the product. Information could be directed to "a qualified electrician" who could be responsible for performing the work.

Measured Maximum Ballast Case Temperature During Normal Operation Inside Fixture(s) (p.25)

We also recommend Energy Star include a more detailed hyperlink to the LRC Proposed Durability Testing Method available on the Energy Star website.

End of Life Protection (p.26)

As above, we request that the submission of a circuit diagram be removed as unrealistic.

Section 5: Effective Date

Qualifying and Labeling Products

At this time we believe the effective date of October 1, 2005 is acceptable, assuming the Version 4.0 criteria can be agreed and finalized by January 1, 2005. However, if the criteria are delayed, the October 1 deadline would have to be reconsidered and possibly pushed back in order to give partners time to adapt their products to the new requirements, including the elimination of magnetic ballasts from all indoor fixtures and those outdoor fixtures that do not contain HID lamps.

Elimination of Automatic Grandfathering

We welcome that to re-qualify products under version 4.0 partners would only have to submit incremental data for those requirements that are new or have been changed from version 3.2.

Section 6: Future Specification Revisions

Tier II Requirements

As discussed, we understand the proposal to re-evaluate randomly selected lamp/ballast combinations each year.

However, we underscore that this evaluation should not require additional testing for lamp-ballast combinations present on the NEMA/ALA Matrix. For randomly selected products from either the lamp or ballast Matrix, the manufacturer should be required to submit a manufacturers test report with the appropriate substantiating data.

We agree that for lamp-ballast combinations that are not on the matrix, additional testing may be required. However, if additional random testing is required for lamp-ballast combinations not on the Matrix, the cost should be borne by Energy Star, not the fixture manufacturer.

Thank you for your consideration and integration of these comments into the next draft. We look forward to continuing to work with you on improving the program criteria.

Figure 1: Preliminary graphical embodiments of the proposed color ellipse spaces