Proposal for Standards – Metal Halide Luminaires

Appliance Efficiency Standards and Measures

for California Energy Commission's Invitation to Submit Proposals

This comment is submitted by the National Electrical Manufacturers Association (NEMA) on behalf of NEMA Lamp and Luminaire Section member companies

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1 Executive summary

This proposal is given with the intent to expand and clarify existing code language regarding the relamping of pulse start ballasted outdoor lighting and to clarify and improve existing language regarding the proper dimming of High-Intensity Discharge (HID) lighting by technology type. No changes to existing technology solutions or performance requirements are intended, rather this proposal seeks to clarify and improve existing language to increase understanding and promote successful compliance.

2 Product Description and Proposal Scope

2.1 Technical Description

This proposal clarifies existing Title 20 language regarding HID products, particularly Metal Halide products and related sections of Title 20 pertaining to "Energy Efficiency Standard for Metal Halide Luminaires", with the goal of improving understanding by those using and enforcing the code, so that HID products are properly specified, procured, installed and operated.

2.2 Technologies and Best Practices for Energy/Water Efficiency

The NEMA proposal does not change existing requirements and so does not add to expand existing technology solutions therein. The NEMA proposal seeks to encourage success in complying with existing regulatory requirements.

2.3 Design Life

N/A, no technology changes/additions are proposed

2.4 Manufacturing Cycle

N/A, no technology changes/additions are proposed

2.5 Product Classes

The NEMA proposal addresses Metal Halide Luminaires, as referred to in Title 20 section 1605.3

3 Unit Energy/Water Usage

N/A, no technology changes/additions are proposed

3.1 Duty Cycle

N/A, no technology changes/additions are proposed

3.2 Efficiency Levels

N/A, no technology changes/additions are proposed

3.3 Energy and/or Water Consumption

N/A, no technology changes/additions are proposed

4 Market Saturation and Sales

4.1 California Stock and Sales

N/A, no technology changes/additions are proposed

4.2 Efficiency Options: Current Market and Future Market Adoption

N/A, no technology changes/additions are proposed

5 Statewide Energy Usage

N/A, no technology changes/additions are proposed

6 Proposal

6.1 Summary of proposal

This proposal is given with the intent to expand and clarify existing code language regarding the relamping of pulse start ballasted outdoor lighting and to clarify and improve existing language regarding the proper dimming of High-Intensity Discharge (HID) lighting by technology type. No changes to existing technology solutions or performance requirements are intended, rather this proposal seeks to clarify and improve existing language to increase understanding and promote successful compliance. The added text in the NEMA proposal is given with the goal of improving selection and installation of compliant products, and their successful installation and operation.

6.2 Implementation Plan

The proposal would be implemented concurrent with existing compliance activities for specification, procurement, installation and operation. No increase in time or resources in pursuing these activities would be required.

6.3 Proposed Test Procedure(s)

N/A, no test procedures are needed relative to this proposal

6.4 Proposed Regulatory Language

Modify text of Section 1605.3 (n) (2) Energy Efficiency Standard for Metal Halide Luminaires, as follows: (All the changes to the actual regulation are in **green** and ~~pink strikethrough~~.)

(B) Metal halide luminaires shall meet one of the following compliance options:

2. A minimum ballast efficiency of 88 percent[3] and an occupant sensor which is an integral control as defined in Section 1602(n) of this Article, shipped with the factory default setting to automatically reduce lamp power through dimming by a minimum of ~~40~~ **30**[1.] percent within 30 minutes or less after an area has been vacated;

3. A minimum ballast efficiency of 88 percent[3] and an automatic daylight control which is an integral control as defined in Section 1602(n) of this Article, shipped with the factory default setting to automatically reduce lamp power through dimming by a minimum of ~~40~~ **30**[1.] percent;

4. A minimum ballast efficiency of 88 percent[3] and a time management control system which is an integral control as defined in Section 1602(n) of this Article, or signaled from a central energy management system, that is set to automatically reduce the lamp power through dimming or switching by a minimum of ~~40~~ 30[1.] percent for a minimum of 4 hours per day.

5.~~4.~~ A minimum ballast efficiency of 88 percent[3]**, with** a permanent, pre-printed factory-installed label **on the luminaire indicating the relamping rated wattage.** ~~that states the relamping rated wattage.~~ **The** relamping rated wattage shall be within only one of the four wattage bins specified in subsections (~~i~~**a**) through (~~iv~~**d**) below **and shall not be rated for any lamp wattage outside of that wattage bin. The luminaire shall be equipped with a ballast able** to operate lamps within only one of the four wattage bins

and **the ballast shall not be labeled or listed or rated to operate lamp wattages outside of that wattage bin.**
a. 150-160 watts; or
b. 200-215 watts; or
c. 290-335 watts
d. 336-500 watts, provided that when a **ballast** ~~luminaire~~ is able to operate 336 to 500 watt lamps, the luminaire shall be prepackaged and sold together with at least one lamp per socket, having a minimum **mean** lamp ~~mean~~ efficacy of 80 lumens per watt based on published mean lumens and rated lamp power (watts)[2.]

Footnotes

1. **Dimming by 30% is requested based on the recently revised NEMA paper, LSD 14, and the assumption that a single dimming wattage limit value is desirable.**
   From LSD 14 - 2012:

Table 2
Recommended Dimming Levels and Positions

Lamp Type	Wattage Range and Burn Position	Maximum Recommended Percent Dimming
Metal Halide, probe start	≤500W Base up position only	Down to 50% rated lamp wattage
	>500W Base up position only	Down to 50% rated lamp wattage
Quartz Metal Halide, pulse start	≤150W Universal operating position with some exceptions (see individual manufacturer specification)	Down to 60% rated lamp wattage,
	>150W Universal operating position with some exceptions (see individual manufacturer specification)	Down to 50% rated lamp wattage
Ceramic Metal Halide pulse start	<150W: Universal operating position with some exceptions (see individual manufacturer specification)	Down to 70% rated lamp wattage
	≥150W: Base up and vertical positions (see individual manufacturer specification)	Down to 60% rated lamp wattage
Specialty MH (i.e., retro-fit, internal ignitor, etc.)	Consult with the lamp manufacturer for specific details about allowable dimming, wattage range, and burn position of these lamp types on specific control systems.	
Self-extinguishing T-type Lamps	These lamps are not recommended for use with any dimming system.	

2. These derating factors are to be applied to the 80 mean LPW requirement:
i) 0.94 for Type-O lamps
ii) 0.94 for coated lamps
iii) 0.85 for lamps designated for operation in non-vertical positions.

3. In the case of multi-voltage, or multi-wattage ballasts, the ballast efficiency is measured at the optimal design efficiency.

Also, it is recommended by NEMA that these definitions be included:

***Type-E Metal Halide Lamp*- A metal halide lamp that does not employ an optically transmissive envelope that surrounds the arc tube and is not intended to prevent the ejection of arc tube particles from the lamp in the event of an arc tube rupture.**
***Type-O Metal Halide Lamp*- A metal halide lamp that employs an optically transmissive envelope that surrounds the arc tube and is intended to prevent the ejection of arc tube particles from the lamp in the event of an arc tube rupture.**
***Coated Metal Halide Lamp*- A metal halide lamp that employs an optically transmissive coating on the lamp outer envelope that is intended to perform as an integral light diffuser, to mitigate glare, and/or to modify the color properties of the lamp.**

7 Technological Feasibility

The proposed changes are presented as clarifications and improvements on the existing language, without express modification to the intent or requirements therein. Technological feasibility of compliance with the existing performance regulations is, if anything, improved by this proposal.

8 Economic Analysis

The NEMA proposal seeks to assure the realization of the analysis which yielded the existing regulatory language and the associated energy savings therewith. This proposal does not add cost, but rather prevents cost overrun due to misunderstanding, inadvertent non-compliance and related lost energy savings, and in some cases reinstallation planning and execution.

8.1 Incremental First Costs

N/A, no technology changes/additions are proposed which would affect this

8.2 Incremental Operating Costs and Savings

N/A, no technology changes/additions are proposed which would affect this

8.3 Infrastructure Costs and Savings

N/A, no technology changes/additions are proposed which would affect this

8.4 State or Local Government Costs and Savings

N/A, no technology changes/additions are proposed which would affect this

8.5 Business Impacts

N/A, no technology changes/additions are proposed which would affect this

8.6 Lifecycle Cost and Net Benefit

N/A, no technology changes/additions are proposed which would affect this

9 Savings Potential

N/A, no technology changes/additions are proposed which would affect this

10 Acceptance Issues

This proposal will improve success in understanding of existing requirements, and thus improve success in achieving compliance. By doing so, acceptance is expected to increase.

11 Environmental and Societal Impacts

By increasing the success rate of compliance, and reducing time lost due to misunderstandings, this proposal assures maximum compliance with existing regulations

and therefore minimizes losses due to mistakes and inadvertent non-compliance. It does not make and negative environmental or societal impacts, and is intended to prevent such.

12 Federal Preemption or Other Regulatory or Legislative Considerations

N/A, no technology changes/additions are proposed which would affect this

13 Methodology for Calculating Cost and Savings

N/A, no technology changes/additions are proposed

14 Bibliography and Other Research

NEMA has references NEMA White Paper LSD-14 2012, *Guidelines on the Application of Dimming to High-Intensity Discharge Lamps*, http://www.nema.org/Standards/Pages/Guidelines-on-the-Application-of-Dimming-to-High-Intensity-Discharge-Lamps.aspx

APPENDIX: Cost Analysis Assumptions

[The Energy Commission used the following rates to evaluate initial proposals received in response to the August 31, 2011 scoping workshop.

The cost of electricity: $0.15 per kWh

The cost of natural gas: $1 per therm

The cost of water: $0.0052 per gallon

Discount rate: 3%

The Energy Commission is investigating whether to update these figures over the course of the rulemaking. Stakeholders are welcome to suggest appliance-specific rates, or alternates to these flat rates to support cost-effectiveness of their proposals. If stakeholders choose a different rate, they should describe the analysis and rationale for the different rate.]