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L•PRIZE®

U.S. Department of Energy

Manufacturing and Installation Phase Submission Instructions and Evaluation Plan Luminaire Track

This document provides submission instructions and detailed information to L-Prize Manufacturing and Installation (M&I) Phase competitors for how their luminaire will be evaluated by the L-Prize Team to verify performance and capabilities as part of the judging process. Competitors should use this information in combination with the L-Prize Official Rules to ensure that their submission includes the necessary documentation, equipment, and capabilities for successful evaluation and judging by the U.S. Department of Energy L-Prize Team.

Please refer to section IV.4 and Appendix D of the Official Rules for a complete list of documentation that should be included in a submission. For any questions about this document or the submission process, please email lprize@nrel.gov.

Luminaire Track – M&I Phase Submission Instructions and Evaluation Plan

Number of Systems to Submit

In addition to documentation and separate from luminaires installed to meet the Installation Site requirement, luminaire track competitors must provide three complete working luminaires for laboratory evaluation: one that will be installed and tested, one that will be disassembled and inspected, and one to have as a backup. For linear pendant luminaires intended to be installed in continuous rows, three independent 4-foot sections that function as independent luminaires must be provided.

DOE will retain ownership of the submitted luminaires following the completion of the evaluation.

Shipping Information

Luminaires should be carefully packaged to prevent damage during shipping. Freight shipping on pallet(s) is strongly encouraged. Test luminaires and any accessories should be marked as fragile and shrink-wrapped to pallet(s) to hold shipments together and reduce potential for damage. Shipping should be coordinated with, and tracking information provided to:

Anne Manning
anathea.manning@pnnl.gov
Tel: 503-417-7559
Cell: 503-927-6165

Luminaires should be shipped to the following address:

CLTB/Anne Manning
c/o Hollywood Lights
5251 SE McLoughlin Blvd
Portland, OR 97202

Luminaires must be shipped **on or before August 5, 2025**. Tracking documentation must verify the August 5, 2025 ship date for the entry to be eligible for evaluation.
All documentation must be received via the HeroX platform by August 5, 2025.

Electrical Requirements

All three luminaires must be provided with an attached, pre-installed, at minimum 18/3 300V UL certified 10-foot power cord and NEMA 5-15P plug for connecting to a typical 120 VAC NEMA 5-15R receptacle. If the power cord is hardwired to the enclosure, a strain relief/cord grip that will prevent damage to the cord shall be used. A quick disconnect shall be used between the LED driver and the power cord (incoming power) to ensure that the LED drivers could be replaced in a safe and easy (plug and play) manner.

Two low-voltage wire leads, violet for DA+ and pink for DA- with polarity clearly marked, should be provided from the DALI terminals on the driver to outside the luminaire that DOE will use to control the luminaires. See "Luminaire Control" section below.

Any component that requires low-voltage DC power shall be submitted with a power supply that converts 120 V AC to the required low-voltage DC source. If a luminaire is designed for use with an electrical distribution system that requires different power connections or voltages such a Power over Ethernet (PoE), please email lprize@nrel.gov for instructions.

Mounting Hardware

All three luminaires must be provided with all mounting equipment that enables mounting in one of the following:

- Suspended/drop ceiling (2'x2' or 2'x4')
- Unistrut track
  - Minimum suspension distance from Unistrut mount = 14"
  - Unistrut details – https://www.mcmaster.com/3310T57-3310T4/

For suspended luminaires intended to be installed below a suspended ceiling grid, the luminaire must include all cords and cables necessary for the suspended mounting.

Luminaire Control

At least one of the luminaires shall be installed in or on the suspended ceiling and connected to 120 V AC power. For the purpose of controlling the luminaire, a certified DALI-2 controller provided by the L-Prize evaluation team shall be connected to the luminaire driver using two low-voltage DC wires from the controller to the DALI-2 input terminals of the driver. The DALI-2 controller shall be used to turn on, off, and dim the luminaire during the evaluation process.

Evaluation Methods

For each Luminaire track requirement described in Appendix A of the Official Rules, Table 1 describes the evaluation methods that will be used to determine whether minimum requirements are met, and any optional points earned. The Expert Review Panel (ERP) is a team of experts who

will score submissions and make determinations of whether minimum requirements are achieved and how many points are earned with the assistance of staff from Pacific Northwest National Laboratory.

Table 1: Evaluation Methods

Requirement	**Documentation Review or Physical Evaluation**	**Approach**
Luminaire Efficacy	Documentation Review	The ERP will review the submitted ANSI/IES LM-79 test report(s) to verify the luminaire efficacy meets the minimum requirement and any additional points that may be earned.
Light Output	Documentation Review	The ERP will review the submitted ANSI/IES LM-79 test report(s) to verify the light output meets the minimum requirement.
Color Rendition	Documentation Review	The ERP will review the submitted ANSI/IES LM-79 test report(s) to verify the color rendering performance meets the minimum requirement and any additional points that may be earned. The .SPDX data will also be evaluated to produce and check color rendering performance. The Rf; Rf,h1; Rcs,h1; and Rg values shown in the LM-79 test report should match those produced from the .SPDX data. The installed luminaire may also be spot-checked for similar color rendering performance as the LM-79 report using a handheld spectroradiometer.
Chromaticity	Documentation Review	The ERP will review the submitted ANSI/IES LM-79 test report(s) to verify the CCT and chromaticity coordinates meet the minimum requirements. The installed luminaire may also be spot-checked for similar chromaticity performance as the LM-79 report using a handheld spectroradiometer.
Glare Control	Documentation Review	The ERP will verify that the submitted .IES file matches the submitted ANSI/IES LM-79 report, assess the competitor's documented determination of luminous area contained within the .IES file for compliance with ANSI/IES LM-63, and calculate a corrected CIE 190:2010 UGR table from the submitted .IES file using Photometric Toolbox® version 2.9 or newer to confirm the UGR values. The ERP will verify that the UGR tabular values meet the minimum requirement.

Temporal Light Modulation	Documentation Review	The ERP will review the submitted ANSI/IES LM-90-20 test results at 100%, 50%, and the minimum dimmed light output to verify the SVM and fundamental frequency performance meet the minimum requirement. Handheld meters may also be used to verify that the luminaire does not utilize pulse-width modulation dimming at frequencies below 20 kHz.
Dimming Range	Documentation Review and Physical Evaluation	The ERP will review the submitted ANSI/IES LM-79 test reports at 100% light output and at the minimum dimmed light output. The ERP will also dim the installed luminaire between maximum and minimum output to check for continuous dimming performance and any visible flickering or color shift. The ERP will use this information to verify that the minimum requirement is met.
Spectral Power Data	Documentation Review	The ERP will check that an SPD file was provided in ANSI/IES TM-27-20 format with data reported for 380–780 nm in ≤ 5 nm increments.
White-tunable	Documentation Review	The ERP will review the submitted ANSI/IES LM-79 test report(s) to verify that the test reports are at 4000 K and that the submitted documentation includes the control type and settings to achieve 4000 K operation.
Visual Comfort	Physical Evaluation	The ERP will observe the luminaire in a laboratory setting and may also observe the luminaire at the installation site(s) and consider luminaire distribution data in scoring the scoring statement for the requirement. The ERP will then score the visual comfort as described in Appendix A of the Official Rules.
Standards-based Digital Driver	Documentation Review	The ERP will verify the LED driver is D4i certified by reviewing a) the certified products list at https://www.dali-alliance.org/products. The ERP will use a DALI controller to check that the D4i DALI Part 251 driver data fields have been populated with information about the luminaire: • Luminaire manufacturer • Luminaire identification number • Luminaire year of manufacture • Luminaire week of manufacture • Nominal input power • Nominal light output • CRI • CCT

Standards-based Sensor Port and Connector	Physical Evaluation	The ERP will inspect the luminaire to verify the receptacle and keep out space dimensions are compliant with Zhaga Book 20, or NEMA LS 20000-2021 shapes RR1, RR2, CC1, CC3, ORC5, or EM1, and the sensor receptacle is pre-wired to the driver with a Zhaga Book 20 compliant connection. A Zhaga Book 20 or NEMA LS 20000-2021 compliant sensor may be physically installed in the receptacle to check for physical fit.
Circular Design	Documentation Review and Physical Evaluation	The ERP will review the submitted TM-66 tool, verified TM-66 certificate, and check the validity of the certificate in the LIA Laboratory certification database to verify the TM-66 score and claimed circular design features of the luminaire meet the minimum requirement and any additional points that may be earned. The ERP will also inspect the physical luminaire to verify claimed circular economy features claimed by the competitor in the TM-66 tool.
Life Cycle Assessment (LCA)	Documentation Review	The ERP will review the submitted LCA to check that it is verified by an LCA practitioner and addresses all required stages, and that the associated Environmental Product Declaration (EPD) is based on the verified LCA.
Replaceable Components	Documentation Review and Physical Evaluation	The ERP will follow the instructions provided by the competitor through their labels or markings to verify that the LED driver and LED array/module or LED light engine are replaceable using conventional tools while the luminaire remains in place.
Labeling and Markings	Documentation Review and Physical Evaluation	The ERP will examine the luminaire's major components to check for the presence of labels or markings that lead or direct to a manufacturer's website. The ERP will then review the website to check that the website provides all the information described in the Supplemental Guidance section of the Labeling and Markings Requirement in Appendix A of the Official Rules.
Materials and Sustainability Innovation	Documentation Review and Physical Evaluation	The ERP will review the submitted narrative and any supporting documentation. The ERP will also inspect the physical luminaire to assess claimed materials and sustainability innovations, as feasible and appropriate. The ERP will then score the materials and sustainability innovations as described in Appendix A of the Official Rules.

Lumen Maintenance	Documentation Review	The ERP will review the submitted ANSI/IES LM-80 test report, ISTMT test report, and ANSI/IES TM-21-21 calculation to verify compliance with the minimum requirements for Lumen Maintenance
Chromaticity Maintenance	Documentation Review	The ERP will review the submitted ANSI/IES LM-80-20 test report for each LED type used to verify compliance with the minimum requirements for Chromaticity Maintenance.
Driver lifetime	Documentation Review	The ERP will review the submitted LED driver ISTMT test report and driver data sheet (or a preliminary driver data sheet if the driver is not commercially released) to verify that the minimum driver lifetime is met.
Technical Innovation – Application Efficiency	Documentation Review and Physical Evaluation	The ERP will review the submitted narrative. If the claimed innovations can be viewed or physically assessed, the ERP may also inspect the physical luminaire to assess claimed application efficiency innovations. The ERP will then score the application efficiency innovations as described in Appendix A of the Official Rules.
Technical Innovation – Form Factor and Aesthetics	Documentation Review and Physical Evaluation	The ERP will review the submitted narrative. If the claimed innovations can be viewed or physically assessed, the ERP may also inspect the physical luminaire to assess claimed form factor and aesthetics innovations. The ERP will then score the form factor and aesthetics innovations as described in Appendix A of the Official Rules.
Technical Innovation – Ease of Installation	Documentation Review and Physical Evaluation	The ERP will review the submitted narrative. If the claimed innovation can be viewed, the ERP may observe the innovation (e.g., during the installation or configuration of the luminaire). If the claimed innovation can be physically evaluated, the Test Operators may test or implement the innovation (e.g., during physical evaluation of the operational luminaire). The ERP will then score the ease of installation and use innovations as described in Appendix A of the Official Rules.
Technical Innovation – Affordability and Value Proposition	Documentation Review and Physical Evaluation	The ERP will review the submitted narrative. If the claimed innovations can be viewed or physically assessed, the ERP may inspect the physical luminaire to assess claimed value proposition and cost-effectiveness innovations. The ERP will then score the value proposition and cost-effectiveness innovations as described in Appendix A of the Official Rules.

Technical Innovation – Health and Wellbeing	Documentation Review and Physical Evaluation	The ERP will review the submitted narrative. If the claimed innovation can be physically evaluated, the Test Operators may test or implement the innovations. The ERP will then score the health and wellbeing innovations as described in Appendix A of the Official Rules.
U.S. Content	Documentation Review and Physical Evaluation	The ERP will review the submitted narrative and any supporting documentation to verify that the narrative includes the minimum information described in Materials to Submit section of the requirement in Appendix A of the Official Rules. The ERP and/or DOE may physically visit locations where U.S. content or manufacturing is claimed to verify it. The ERP will then score the U.S. content as described in Appendix A of the Official Rules.
Production and Deployment Plan	Documentation Review and Physical Evaluation	The ERP will review the submitted Production and Deployment Plan to verify that the plan includes the minimum information described in the Supplemental Guidance section of the requirement in Appendix A of the Official Rules. The ERP and/or DOE may physically visit manufacturing or assembly sites to verify what is described in the plan. The ERP will then score the Production and Deployment Plan as described in Appendix A of the Official Rules.
U.S. Installation	Documentation Review and Physical Evaluation	The ERP will review the site installation document to verify that the document includes the minimum information described in the Material to Submit section of the requirement in Appendix A of the Official Rules. The ERP and/or DOE will visit the site to check that the installation and site match what is described in the installation document and that all minimum requirements for the site are met. The ERP and/or DOE may implement or require demonstration to verify that luminaires are successfully installed and functioning with at minimum on, off, and dimming control. The ERP will then determine whether the U.S. Installation meets the minimum requirement as described in Appendix A of the Official Rules.

Commercial Availability	Documentation Review	The ERP will review the submitted documentation to verify that spec sheets, marketing materials, installation guides, and other relevant luminaire documentation are provided to indicate full commercial availability. The ERP will verify that safety certification documentation (e.g., authorization to mark) is provided for the luminaire. The ERP will then determine whether the luminaire meets the requirement for commercial availability as described in Appendix A of the Official Rules.