L•PRIZE®

U.S. Department of Energy

# Manufacturing and Installation Phase Technical Performance and Scoring Form

# Luminaire Track

This form is to be used by the competitor to report key performance metrics or capabilities of their luminaire and the associated points they expect would be earned for these performances or capabilities. This form is in addition to the technical documentation that must be submitted as described in Appendix A of the Official Rules for each requirement. A summarized checklist of these technical documentation requirements is provided in Appendix D of the Official Rules. The L-Prize Expert Reviewer Panel will use this Technical Performance and Scoring Form in combination with submitted documentation and physical evaluation (where applicable) to determine the total number of points earned for a submission.

Instructions

1. Review Section IV.4 of the L-Prize Official Rules to understand how this form will be used about how the total score for a submission will be determined.
2. Report the performance or capability and associated number of points earned for each requirement in this form, based on Appendix A of the Official Rules.
3. Provide any additional notes you would like the Expert Reviewer Panel to know about the performance, capability, or points earned.
4. Forms must be completed digitally; handwritten forms will not be accepted.
5. Save the file as a PDF and submit as part of your Manufacturing and Installation (M&I) Phase submission at https://www.herox.com/LPrize.

| Luminaire Efficacy | The total emitted luminous flux from the luminaire divided by the total source electrical input power |
|---|---|
| **Minimum Requirement(s)**<br>The initial luminous efficacy of each luminaire must be ≥ 150 lumens per watt. | **Possible Points**<br>Two points **(+2)** will be awarded for each additional increment of 10 lumens per watt above 150 up to a maximum of 10 points.<br><br>≥ 160 lumens per watt = 2 additional points<br>≥ 170 lumens per watt = 4 additional points<br>≥ 180 lumens per watt = 6 additional points<br>≥ 190 lumens per watt = 8 additional points<br>≥ 200 lumens per watt = 10 additional points |
| **Enter the lumens per watt of the luminaire:** | |
| **How many efficacy points are earned based on this lm/W? (Enter 0, 2, 4, 6, 8, or 10)** | |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the luminaire efficacy performance or points earned.** | |

| Light Output | The luminous flux output by the luminaire |
|---|---|
| **Minimum Requirement(s)**<br>The initial luminous flux must be > 2,000 lumens. | **Possible Point(s)**<br>n/a |
| **Enter the luminous flux of the luminaire:** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the luminous flux output performance.** | |

| Color Rendition | How a luminaire makes the color of an object appear to human eyes and how well subtle variations in color shades are revealed |
|---|---|
| **Minimum Requirement(s)**<br>The color rendition performance must meet a preference rating of P2 and fidelity rating of F3 in accordance with ANSI/IES TM-30-20, Annex E.<br><br>Rf ≥ 85; Rf,h1 ≥ 85; Rcs,h1 ≥ -7%; Rg ≥ 92 | **Possible Points**<br>Five points **(+5)** will be awarded for a preference rating of P1 and fidelity rating of F3.<br><br>Rf ≥ 85; Rf,h1 ≥ 85; Rcs,h1 ≥ -1%; Rg ≥ 95 |
| **Enter the Rf, Rf,h1, Rcs,h1, and Rg values of the luminaire:** | |
| **How many color rendition points are earned based on this performance? (Enter 0 or 5)** | |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the color rendition performance or points earned.** | |

| Chromaticity | The quality of color, independent of brightness |
|---|---|
| **Minimum Requirement(s)**<br>The nominal correlated color temperature (CCT) must be 4000 K as defined in ANSI C78.377-2017.<br><br>The Duv must be between -0.006 and +0.002 as defined in ANSI C78.377-2017. LEDs shall be binned and selected such that any sample would result in a Duv within -0.006 and +0.002. | **Possible Points**<br>n/a |
| **Is the luminaire white-tunable?** | |
| **Enter the as-tested CCT of the luminaire:** | |
| **Enter the Duv of the luminaire:** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the chromaticity performance.** | |

| Glare Control | The ability of the luminaire to limit discomfort glare. Discomfort from glare can cause annoyance, distraction, or discomfort but does not necessarily impair the visibility of objects. |
|---|---|
| **Minimum Requirement(s)**<br>Every unit in the test sample must have a unified glare rating (UGR) ≤ 22, per the method of evaluation described in the Official Rules. If the UGR ≤ 22 minimum requirement is not met, a technical justification reviewed by the Expert Reviewer Panel is determined to be acceptable for minimum glare control performance. | **Possible Points**<br>n/a |
| **Enter the UGR of the luminaire:** | |
| **If the UGR requirement is not met, is a technical justification provided?** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the glare control performance.** | |

| Temporal Light Modulation (TLM, aka "flicker" waveform) | TLM is the light modulation (stimulus) that may produce unwanted visual or non-visual responses. TLM should minimize undesired visual responses of light by (direct) flicker, the stroboscopic effect, and the phantom array effect. |
|---|---|
| **Minimum Requirement(s)**<br>Every unit in the test sample must exhibit a fundamental TLM frequency > 90 Hz and a stroboscopic effect visibility measure (SVM) ≤ 0.4 at dimming levels of 100%, 50%, and the minimum dimmed light output. Pulse-width modulation (PWM) dimming is not permitted at fundamental TLM frequencies below 20 kHz. | **Possible Points**<br>n/a |
| **Enter the expected fundamental TLM frequency and SVM performance at 100%, 50%, and the minimum dimmed light output:** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the temporal light modulation performance.** | |

| **Dimming Range** | **The range over which it is possible to vary the intensity of the light output of a lamp or luminaire from a maximum to a minimum with stable performance** |
|---|---|
| **Minimum Requirement(s)**<br>Luminaire dimming range must extend from maximum lumen output (100%) to a minimum lumen output value that is ≤ 5% of maximum lumen output.<br><br>Dimming between minimum and maximum output points must be continuous.<br><br>The change of chromaticity over the dimming range must be ≤ 0.004, calculated as the distance between coordinate pairs on the CIE 1976 (u',v') diagram. | **Possible Points**<br>n/a |
| **Enter the minimum dimmed light output in lumens and the dimming range of the luminaire in terms of percent light output (e.g., 1%–100%):** | |
| **Enter the change of chromaticity over the dimming range:** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the dimming range performance.** | |

| Standards-Based Sensor Port and Connector | A Zhaga Book 20 or NEMA EM1 compliant sensor port with pre-wired connections to the D4i driver |
|---|---|
| **Minimum Requirement(s)**<br>Luminaires must incorporate a standardized sensor receptacle aperture with physical shape and minimum keep-out area dimensions in compliance with Zhaga Book 20 or NEMA LS 20000-2021 shapes RR1, RR2, CC1, CC3, ORC5, or EM1. The sensor receptacle must be pre-wired with a Zhaga Book 20 compliant 2-wire connection to the DALI-bus terminals of the D4i driver. | **Possible Points**<br>n/a |
| **What is the shape/size of the sensor port used in the luminaire? (Enter one of the following shapes from Zhaga Book 20: R44x17, R60x22, C22-T1A, C22-T1B, C22-T2, and/or one of the following shapes from NEMA LS 20000-2021: RR1, RR2, CC1, CC3, ORC5, EM1)** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the standards-based sensor port and connector compliance.** | |

| Circular Design | Circular design supports a closed-loop economic system that minimizes raw resource inputs as well as minimizing waste, pollution, and carbon emissions. Circular design aims to eliminate waste and maximize the continual reuse, repair, and remanufacturing of components. |
|---|---|
| **Minimum Requirement(s)**<br>TM66 Circular Economy Assured quality mark for the design and manufacture of lighting products of 2 or higher. | **Possible Points**<br>Five points **(+5)** will be awarded for luminaires that achieve a TM66 CEAM-Make score of ≥ 2.5<br><br>An additional five points **(+5)** will be awarded for luminaires that achieve a verified TM66 CEAM-Make score of ≥ 3 (10 points total). |
| **Enter the total score from TM66 CEAM-Make tool for the luminaire:** | |
| **How many circular design points are earned based on this score? (Enter 0, 5, or 10)** | |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the circular design performance or points earned.** | |

| Lumen Maintenance | The elapsed operating time at which the specified percentage of the initial light output is reached, expressed in hours |
|---|---|
| **Minimum Requirement(s)**<br>The luminaire must maintain 90% of the initial light output for at least 36,000 hours ($L_{90}$ ≥ 36,000 hrs), and 70% of the initial light output for at least 50,000 hours ($L_{70}$ ≥ 50,000 hrs). | **Possible Points**<br>n/a |
| **Enter the $L_{70}$ and $L_{90}$ values of the luminaire in hours:** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the lumen maintenance performance.** | |

| Chromaticity Maintenance | A shift in the appearance of color of a light source that occurs over time |
|---|---|
| **Minimum Requirement(s)**<br>The change of chromaticity over the initial 6,000 hours of operation must be ≤ 0.002, calculated as the distance between coordinate pairs on the CIE 1976 (u',v') diagram. | **Possible Points**<br>n/a |
| **Enter the expected change in chromaticity of the luminaire over the initial 6,000 hours of operation:** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the chromaticity maintenance performance.** | |

| Driver Lifetime | The amount of time an LED driver is expected to perform its intended functions under a specific set of environmental, electrical, and mechanical conditions, expressed using an appropriate statistical metric |
|---|---|
| **Minimum Requirement(s)**<br>The measured temperature of the driver at the temperature measurement point (TMP), specified by the driver manufacturer and tested in situ, must be less than or equal to the maximum case temperature for which the driver is designed to last ≥ 50,000 hrs. | **Possible Points**<br>n/a |
| **Enter the estimated driver lifetime of your luminaire (in hours) based on the expected operating conditions:** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the driver lifetime performance.** | |

| **Commercial Availability** | **The commercial availability of the luminaire including complete product literature and marketing materials** |
|---|---|
| **Minimum Requirement(s)**<br>The luminaire must be fully commercially available for purchase with complete, final documentation and literature readily available on the manufacturer's website. The luminaire must also be certified with all appropriate electrical and fire safety certifications. | **Possible Points**<br>n/a |
| **Enter the location of the product website listing and spec sheets, marketing materials, installation guides, and other relevant product documentation to indicate full commercial availability.** | |
| **List documentation demonstrating appropriate safety certifications of the luminaire from a recognized safety certification body such as UL, CSA, or ETL.** | |
| **Points are not applicable for this requirement.** | n/a |
| **Provide any additional notes you would like the Expert Reviewer Panel to know about the commercial availability.** | |