# DLC Premium Requirements

## *under Technical Requirements V5.1*

**[Effective July 1, 2020]**

DLC Premium is a higher-performance classification for luminaires and retrofit kits. The Premium classification is intended to differentiate products that achieve higher energy savings *while* delivering light quality and controllability performance that exceed DLC Standard requirements. Products submitted to the DLC Premium classification must meet more stringent efficacy, quality of light, and controllability requirements as outlined below. The "QPL Listing" column describes the information that appears as publicly available on the Qualified Products List, if applicable. "The Method of Evaluation" column describes how the products will be evaluated for qualification, whether by compliance with industry standards, manufacturer claims, or other DLC verification methodology.

## Eligibility

Only luminaires and retrofit kits are eligible for qualification under DLC Premium. The following product types are not eligible to qualify for the DLC Premium classification:

- Replacement lamps
- Linear-Style Retrofit Kits for 2x2, 1x4, and 2x4 Luminaires
- Products with a Primary Use designated as "Specialty"

## DLC Premium Requirements

**Table 1:** V5.1 DLC Premium Testing and Reporting Requirements*

| Metric | V5.1 Premium Requirements* | QPL Listing | Method of Evaluation |
|---|---|---|---|
| **Efficacy** | **+15 lumens per watt** over V5.1 Standard efficacy requirements | Same as V5.1 Standard | Same as V5.1 Standard |
| **Chromaticity (CCT & $D_{uv}$)** | *All Indoor products, except High-Bay*: Products shall exhibit chromaticity consistent with at least one of the basic, flexible, or extended, nominal **4-step quadrangle** CCTs from 2200K – 6500K<br>*All other products*: Same as V5.1 Standard | Same as V5.1 Standard | Same as V5.1 Standard |
| **Discomfort Glare** | *Troffer (Luminaire and Integrated Retrofit Kits only):* **Corrected UGR < 22.0** (Note: Linear-Style Retrofit Kits for 2x2, 1x4, and 2x4 Luminaires are not eligible for Premium qualification under V5.1.) | UGR values not published on the QPL | Corrected UGR values generated per CIE 190-2010 at the reference condition below.<br>Room dimension: X = 4H, Y = 8H<br>Spacing to height ratio (S/H): 1<br>Reflectances: 70/50/20% |
| | *Linear Ambient (Luminaire and Retrofit Kits):* **Corrected UGR < 22.0** | | |
| | *Low-Bay (Luminaire and Retrofit Kits)*: **Corrected UGR < 25.0** | | |
| | *High-Bay (Luminaire and Retrofit Kits)*: **Corrected UGR < 28.0** | | |
| | *All other products*: **n/a** | | |
| **Controllability** | All products shall be **capable of continuous dimming**. Stepped dimming is not acceptable for Premium qualification.<br>(note: integral control reporting is no longer a Premium requirement since it is required of all qualified products). | Same as V5.1 Standard | Same as V5.1 Standard |
| **Lumen Maintenance** | $L_{90} \geq 36{,}000$ hours<br>(Note new LM-80 / TM-21 guidance. See Additional Reporting Guidelines: IES TM-21-11 and its Addendum B) | Lumen Maintenance values not published on the QPL | TM-21 projections in the same manner as the V5.1 Standard $L_{70}$ requirements |

| | | | |
|---|---|---|---|
| **Driver ISTMT** | Measured temperature at the $TMP_{ps}$ is less than or equal to the allowable operating temperature specified by the power supply manufacturer when tested in-situ under steady-state operating conditions, with case temperature measured at the designated TMP.<br><br>(No change from V5.0) | Driver ISTMT values not published on the QPL | (1) Laboratory test report indicating the measured temperature from the $TMP_{ps}$;<br><br>(2) A picture of the $TMP_{ps}$ location;<br><br>(3) Driver manufacturer documentation indicating the maximum case temperature for which the driver is designed to last ≥50,000 hours. |

* For any metric not listed in this table, V5.1 Standard requirements apply.

## Test Report and Implementation Requirements

If a manufacturer seeks qualification of its product(s) to the DLC Premium classification, it shall provide all the necessary testing to demonstrate that the product(s) meet the Premium classification's requirements in addition to meeting all base V5.1 Standard requirements. Topic-specific details are described below.

## Color Rendition and Chromaticity (CCT & $D_{uv}$)

In the pathways described below, "option" (color rendition or CCT) is used to describe a specific, nominal performance variation in a given set, for a product or product family.

- In addition to the test report and implementation requirements for DLC Standard qualification, a full LM-79/color report, per the Additional Reporting Requirements, for the maximum color rendition option at the lowest CCT option, shall be provided.
- For example, if a product family consists of two color rendition options (e.g. CRI Ra=80, R9=0 and CRI Ra=90, R9=50) and four CCT options (e.g. 2700 K, 3500 K, 4000 K, and 5000 K), and *all* variations are to be qualified to DLC Premium, a minimum of three LM-79 test reports shall be provided. That is, one test for the highest CCT at the minimum color rendition option, one test for the lowest CCT at the minimum color rendition option, and one test at the lowest CCT for the higher color rendition option.
- Consistent with the Standard classification requirement, tested color rendition options shall meet either (Option 1) the IES TM-30-18 color rendition requirements or (Option 2) the CIE 13.3-1995 color rendition requirements, as described in Table 2, and *both* sets of color rendition measures shall be measured and reported.

- All variations of CCT offered shall fall within at least one of the basic, flexible, or extended nominal, 4-step quadrangles (for all indoor products, except high-bay), or 7-step quadrangles (for all outdoor and high-bay products) from 2200 K to 6500 K as defined by ANSI C78.377-2017.
- The DLC also requires that testing be conducted on the worst-case efficacy variation, which is likely the combination of lowest CCT and highest color rendition.
- In all cases, testing requirements correspond to technical requirements levels, in addition to product options. For example, if a family includes multiple color rendition options, some of which are eligible for an allowance, and some of which are not, testing would be required at the worst-case (efficacy) color rendition option *that meets the allowance requirement*, for the subgroup of products which want to be granted the allowance, and the minimum color rendition *overall* for the remainder of the group.

## Discomfort Glare

The Premium discomfort glare requirements are only applicable to products within the eligible luminaire and retrofit General Applications, namely, Troffers, Linear Ambient, Low-Bay and High-Bay. (Note: Linear-Style Retrofit Kits for 2x2, 1x4, and 2x4 Luminaires are not eligible for Premium qualification under V5.1). Applications shall include the following additional materials:

- A full LM-79/distribution report per the Additional Reporting Requirements for the products that have the highest total lumen output for each optical variation within the family without consideration of the effect of color properties[1] tested at the maximum (non-dimmed) light output and the .ies file based on the LM-79 test data.
- Indication on the application form which UGR bin the product's Corrected UGR value falls in. The options for the UGR bins on the application form are 10.0-12.9, 13.0-15.9, 16.0-18.9, 19.0-21.9, 22.0-24.9, and 25.0-27.9.

Qualification for Premium is verified by the application reviewer using the Corrected UGR table in **Photometric Toolbox32** (Lighting Analysts, Inc., version 2.7 or newer) generated from the submitted tested .ies file. If the values in the UGR table for the glare evaluation reference condition (room dimension: X = 4H, Y = 8H; spacing to height ratio: 1; reflectances: 70/50/20%) meet the requirements both viewed endwise and crosswise, the product, or family of products in the case of family grouping applications, qualifies for the DLC Premium classification.

## Driver ISTMT and Specification Sheet

As part of the DLC Premium application process, manufacturers must provide the following:

1. Test report from a lab that meets the DLC's Laboratory Requirements for ISTMTs. The report must include the measured temperature from the $TMP_{ps}$.
2. A picture of the $TMP_{ps}$ location with an arrow indicating the thermocouple attachment point.

[1] The color properties, such as CCT and CRI, of the product within the product family used for the LM-79/distribution test may be of the applicant's choice.

3. Documentation from the driver manufacturer that indicates the maximum case temperature for which the driver is designed to last ≥50,000 hours, as well as the TMP location it designates for thermal testing.

    - Custom and integrated drivers must provide documentation equivalent to that required for drivers from third-party vendors. Manufacturers must supply documentation indicating the maximum acceptable temperature for the driver for 50,000-hour life, as well as the TMP to be used during thermal testing and evaluation.

The luminaire passes the driver ISTMT requirements if the measured temperature at the $TMP_{ps}$ is less than or equal to the allowable warranty temperature specified by the power supply manufacturer. Drivers shall be tested *in-situ* under steady-state operating conditions, with case temperature measured at the designated TMP.

One or more additional thermocouples are attached to the power supply/driver at the $TMP_{ps}$. For off-the-shelf remote power supplies, manufacturers typically provide a measurement location (case temperature designated by a "dot" adjacent to a ($t_c$) symbol) for warranty purposes. In situations where the $TMP_{ps}$ is not designated by the manufacturer, or where power supplies are integrated with the LED package(s), array, or module(s), luminaire manufacturers should identify the $TMP_{ps}$ to be used for warranty purposes. Note that this includes situations where the driver/power supply is not purchased from an outside vendor, and where the driver/power supply is integrated into the luminaire or lamp.

The thermocouple tolerance shall conform to ASTM E230 Table 1 "Special Limits" (≤1.1$^{o}$C or 0.4%, whichever is greater).

UL 1598 testing may be used for the ISTMT report if the lab that conducted the test meets the DLC's laboratory requirements for ISTMT.

Custom and integrated drivers must provide equivalent driver spec sheet documentation as drivers from third-party vendors. This also applies to private labeled drivers where the private labeler does not market the private labeled driver and therefore does not have a public-facing driver spec sheet for the driver. Equivalent driver spec sheet documentation must include information on the rated driver performance, including but not limited to: input and output characteristics, the maximum case temperature for which the driver is designed to last ≥50,000 hours, TMP location, as well as the specific driver model number. Reviewers may ask for additional driver information.

## Interactions with other DLC Policies

For **Field Adjustable Light Distribution (FALD)** products seeking Premium classification, the UGR value shall meet the threshold at the light distribution setting designated, per the FALD policy, for meeting the ZLD requirements of the PUD, for which the product is seeking qualification.