



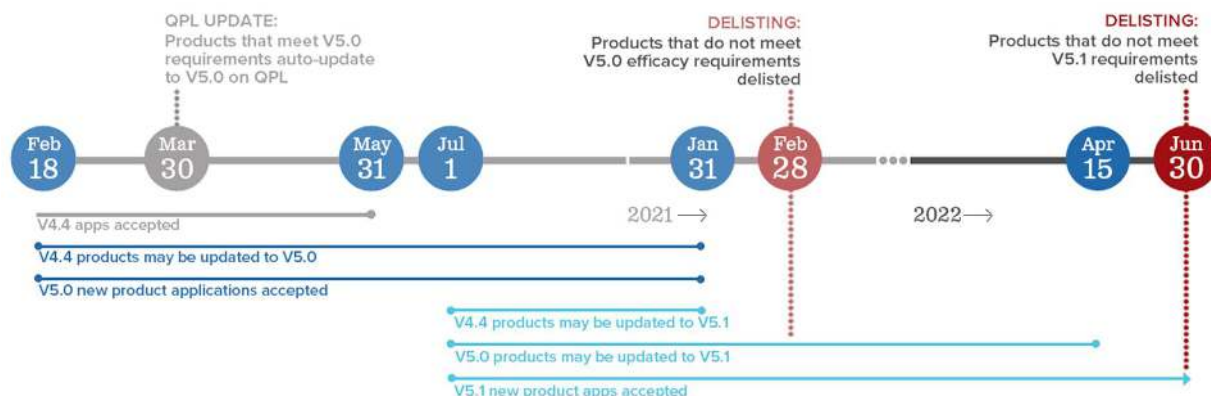
Transition to Technical Requirements SSL V5.0 and V5.1

V5

Member Talking Points

The [V5 Technical Requirements](#) address the energy, quality, and controllability aspects of solid-state lighting (SSL) products listed on the DLC Qualified Products List (QPL). V5 consists of two separate policies (V5.0 and V5.1) released on February 14, 2020 with staggered timelines and effective dates. These updates introduce new metrics that align with current research, industry practices and guidelines, and market readiness.

The DLC released the V5.0 policy in concept in January 2019, and a second draft of the policy in October 2019. After consideration of stakeholder comments, discussion with DLC members, and further research and analysis, the DLC determined a two-phase approach to be the best course to realize energy savings, incorporate controls capabilities, and improve on the quality of light of listed products. Grace periods for product updates will give manufacturers time for testing and design changes, and a phased approach eases the transition to products that provide better quality of light and greater energy savings for people living and working in the built environment.



V5.0, the first of the two SSL Technical Requirements revisions, increases the efficacy requirements for listed products with the pace of technology, without compromising the quality of light. V5.0 also includes new dimming requirements for most indoor luminaires and retrofit kits, as well as requirements for reporting on integrated controls for DLC Premium products – a change designed to increase energy savings by providing a gateway to controls utilization and improved user satisfaction.

V5.1, the second phase of the two SSL Technical Requirements revisions, establishes requirements and reporting standards for quality of light characteristics such as color performance, glare, and light distribution, as well as dimming requirements for all DLC-listed products, including indoor lamps and exterior luminaires and reporting on integrated controls and control communication protocol. Incorporating these metrics on the SSL QPL will help ensure high-quality products are listed, superior performing products can be differentiated, and additional energy savings are realized.

V5.0 and V5.1 Key Changes

Metric	Version Impacted	Description	V5 Policy Updates	Potential Benefits
Efficacy	V5.0 and V5.1	A measure of light output delivered per unit of input power (lumens per watt)	V5.0 increases minimum efficacy thresholds (by 12% on average) for all product categories. DLC Premium efficacy is 15 lumens per watt higher than DLC Standard. V5.1 does not further increase efficacy but includes an update to the High-Bay PUD and adds a new General Application for Low-Bay.	Customers and EE programs can realize additional energy savings through higher efficacy products. EE programs can designate rebates for low-bay products separate from high-bay, if desired.
Dimming	V5.0 and V5.1	The capability to vary light output of a product over a continuous range or in predetermined steps	V5.0 requires continuous dimming for all DLC Premium products. V5.1 extends the dimming requirement to all lamps and most indoor and outdoor luminaires and retrofit kits. Products in outdoor primary uses can be stepped or continuously dimmable.	Dimming is a strategy that can achieve additional energy savings alone or as part of a control solution that includes daylight dimming and high-end trim. If controls aren't installed initially, dimmable products allow the functionality to be added later. Dimming can also improve occupant satisfaction and mitigate issues with over-lighting and glare.
Color of Light	V5.1 <i>(V5.0 does not change from V4.4.)</i>	The color of the emitted light (CCT) and a product's ability to maintain chromaticity over time (maintenance)	V5.1 expands the range of acceptable CCT values (up to 6500 K) and introduces a color maintenance requirement. Additionally, V5.1 Premium products will be required to meet tighter CCT tolerances.	Customers and specifiers will have a wider range of CCT selection. Products will deliver color appearance that is less likely to shift over time. DLC Premium products will exhibit more consistent color from one product to the next within the same model and across all manufacturers.
Color Rendition	V5.1 <i>(V5.0 does not change from V4.4)</i>	The effect of an illuminant on the color appearance of objects by comparison with a reference illuminant	V5.1 requires all products to report CIE 13.3 (CRI) and IES TM-30 color rendition measures and allows products to qualify using either set of color rendition measures. The CRI requirement for outdoor products increases from 65 to 70 and red rendition thresholds will be set for all products.	Customers and specifiers can gain more information on product color rendition and superior color performance from the QPL using both CRI and TM-30 metrics. Outdoor products will be required to achieve modestly higher color rendition performance.

Metric	Version Impacted	Description	V5 Policy Updates	Potential Benefits
Light Distribution	V5.1 <i>(V5.0 does not change from V4.4)</i>	The spherical directional intensity of light emitted from a source	V5.1 introduces a beam angle requirement for linear replacement lamps (TLEDs) in place of testing in a reference fixture. Outdoor luminaires are required to report BUG (backlight, uplight, glare) ratings.	Customers and specifiers will be able to identify TLED beam angles to better inform product selection. Customers and specifiers will be able to use the QPL to identify outdoor luminaire BUG ratings, which are required by many codes and ordinances.
Discomfort Glare	V5.1 <i>(V5.0 does not address glare)</i>	A sensation of annoyance or pain caused by high luminance in the field of view	V5.1 introduces discomfort glare thresholds, based on the unified glare rating (UGR), for DLC Premium troffers, linear ambient, low-bay, and high-bay luminaires and retrofit kits. Also, products that exhibit more stringent glare control can access efficacy allowances.	DLC Premium products will be less likely to produce discomfort glare while achieving higher efficacy performance. Efficacy allowances will encourage manufacturers to design and produce products that can achieve stricter glare performance.
Integral Controls	V5.1 <i>(V5.0 does not change from V4.4)</i>	The capability to have sensing and/or control of light output directly integrated or embedded into a lamp or luminaire	V5.1 requires all products report on specific integral control sensor types and capabilities such as occupancy, daylight, LLLC, and energy monitoring.	Customers, specifiers, and EE programs will be able to identify products that can achieve additional energy savings through integral control sensors and capabilities.
Control Communication	V5.1 <i>(V5.0 does not address control communication)</i>	The method and capability of a lighting system to receive and implement commanded changes to the operation, dimmed state, color setting, timing, etc.	V5.1 requires all products report on the type of communication (wired, wireless) and the availability of specific communication protocols.	Customers and specifiers will be able to identify products that may be compatible with various lighting control systems based on the communication type (wired, wireless) and protocol.

Updated Requirements for Evolving Technology

LED technology has transformed commercial and industrial (C&I) lighting, achieving ever higher levels of energy efficiency in office buildings, schools, hospitals, retail, and other facilities. In recent years of the LED technology transformation, the market emphasis has been on higher efficacy with a drive to reduce product costs. In some instances, these goals have been achieved at the expense of the “quality of light” that an SSL product delivers. The DLC’s V5.0 and V5.1 SSL Technical Requirements put new emphasis on quality characteristics, while continuing a decade-long push to maximize energy efficient solutions through LEDs.

Changes to the DLC Website and QPL

Technical Requirements Tables (TRTs)

The DLC website [Technical Requirements](#) pages are updated to display three sets of Technical Requirements Tables (V4.4, V5.0, and V5.1). Tables have been updated to group information as follows:

V5.0 Technical Requirements Tables

- **Table 1:** Categories, General Applications, and Primary Use Designations (PUD)
 - Combines Table 1, 2 and 3 from V4.4 and moves requirements for efficacy, light output, CCT/CRI & PUD specific info to separate tables (see below) and removes warranty
- **Table 2:** Minimum Efficacy and Light Output Requirements for DLC Standard and DLC Premium Luminaires and Retrofit Kits (PUD specific minimum light output requirements in Table 5)
- **Table 3:** Efficacy Requirements for DLC Linear Replacement Lamps and Four Pin-Base Replacement Lamps for CFLs [In-Luminaire and Bare-Lamp]
- **Table 4:** Efficacy Requirements for DLC Standard Mogul Screw-Base (E39/E40) Replacements for HID Lamps [In-Luminaire]
- **Table 5:** Light Output and Distribution Requirements by Primary Use Designation
 - Note: Order of Primary Use W and X were switched to: W High-Bay and X Low Bay
- **Table 6:** Controllability Requirements for DLC Standard and DLC Premium
- **Table 7:** DLC Premium Requirements Summary
- **Table 8:** Lumen Maintenance requirements for DLC Standard and DLC Premium
- **Table 9:** Option 1 TM-21 Projected Lumen Maintenance Requirements (removed in V5.1)
- **Table 10:** Color Rendering and Color Appearance Requirements
- **Table 11:** Allowances to Efficacy Requirements
- **Table 12:** Tolerances
- **Table 13:** NEMA Beam Classification

V5.1 Technical Requirements Tables

- V5.1 Technical Requirement Tables will follow the same order as V5.0 for **Tables 1-8**
 - **Table 1** has re-numbered General Applications to accommodate the addition of a new Low Bay Category (new number 10)
 - **Table 9** in V5.0 removed in V5.1
- **Table 9:** DLC Standard and DLC Premium Spectral Quality Requirements
 - Transition from CRI to specific TM30/CIE requirements (replaces Table 10 in V5.0)
- **Table 10:** Allowances to Efficacy Requirements
- **Table 11:** Tolerances
- **Table 13:** NEMA Beam Classification

QPL Tile and Download Changes under V5.0 (as of February 14, 2020):

Product tiles may display version status based on the Technical Requirements version number they meet (V4.4, V5.0, and after July 1, V5.1)

- V4.4 products that meet V5.0 will be automatically updated to V5.0 beginning on March 30, 2020 [and](#) ~~{automatic updates will continue throughout the year}~~.

QPL Tile and Download Changes under V5.1 (as of July 1, 2020):

New fields will be added to the QPL product tiles to display new required metrics under V5.1.

- New Color fields under Tested / Reported Data:
 - Chromaticity (CCT & Duv)
 - Color rendition (Ra, R9, Rf, Rg, Rcs, h1)
- New Light Distribution tab (Removed Zonal Lumens and Spacing Criteria tabs)
 - Beam Angle (TLEDs only)
 - B U G field (outdoor only)
- New Control Features tab
 - Dimming
 - Dimming capability (continuous, stepped, none)
 - Range of continuous dimming (if applicable) (Below 10%, Above 10%)
 - Integral Controls
 - Integral control sensors
 - Integral control capabilities
 - LLLC model name (if applicable)
 - Control Communication
 - Wired Communication Protocols
 - Wireless Communication Protocols

V5.1 Lamp Dimming Requirements

A new requirement for dimming applies to most indoor luminaire and retrofit kit products under V5.0. Products that do not meet this requirement by February 28, 2021 will be delisted. Subsequently, in V5.1, the dimming requirement is extended to include all lamps and most outdoor products.

The DLC's research and outreach on TLED dimming showed that the capability was technologically feasible, is already reflected on many products in the market, and can enable TLEDs to work with networked lighting controls. Some of the specific findings that may be helpful to DLC members include:

- Stakeholders provided comments that dimming should apply equally to lamps, fixtures, and retrofit kits.
- Free ridership is expected to increase during the coming years, eroding the savings potential from standard TLEDs. Dimmable (and especially networked) TLEDs can potentially offset some of the free ridership impacts and allow TLEDs to remain in C&I portfolios longer.

Since linear replacement lamps (TLEDs) are a high-volume measure for many DLC members, this change is important to be aware of. Products that will not meet the new technical requirements and are likely to be delisted may be discounted by manufacturers or offered as "close-out" pricing to distributors and installers. It is recommended that trade allies verify status with manufacturers and exercise caution when stocking products that are not updated to V5.0 in 2020, and to V5.1 in 2021. The DLC has provided email templates to members that can be customized for communication with their trade allies.

V5 Resources Provided

Manufacturers

The DLC website provides [V5.0 Manufacturer Guidance](#) to help manufacturers with submitting products and compliance with the new SSL Technical Requirements.

Members

- Email templates are provided in the Member Portal that can be used by member programs to notify customers, staff, and trade allies of changes to DLC requirements.
- Guidance and educational materials for utility energy efficiency programs, their staff, customers, and trade allies will be prepared and distributed to Members prior to V5.1 release on the following topics:
 - Resources for trade allies
 - Benefits of new metrics/requirements
 - Product selection guidance
 - Communication guidance
 - Education
 - Regulators/Evaluators
 - Program Staff
 - Anticipated average efficacy performance, by product category, under V5.0 for use in TRMs
 - Data on dimmable TLED savings, prices, and incremental costs
 - Guidance on dimmable TLED compatibility, manufacturer claims, and non-dimmable products
 - Product availability at distribution (close-outs of soon to be de-listed products)

Please feel free to reach out to Lani Malapan emalapan@designlights.org with any other questions or resources needed.