Solid-State Lighting (SSL) Manufacturer and Industry Guidance Versions 5.0 & 5.1

Final Version

Released: February 14, 2020

Updated May 2021 - Timeline Changes Due to COVID-19

To address the continuing disruptions to daily operations and supply chains due to COVID-19, the following changes have been made:

- **APRIL 2020**: Timelines for updating V4.4 products and submitting V5.0 new product applications have been extended, and the original dimming requirement for V5.0 Standard products has been postponed to V5.1.

- **NOVEMBER 2020**: Postpones the V4.4 delist date from December 31, 2020 to February 28, 2021. Additionally, this update further extends the deadline to submit update applications of V4.4 products to V5.0 or V5.1 from November 30, 2020 to January 31, 2021. These updates allow two additional months over the previous timeline extensions for V4.4 applications granted in April 2020.

- **MAY 2021**: Postpones the V5.0 delist date from December 31, 2021 to June 30, 2022. Additionally, this update further extends the deadline to submit update applications of V5.0 products to V5.1 from October 15, 2021 to April 15, 2021. These updates allow six additional months over the original timeline.

This document contains changes from the April 2020, November 2020, and May 2021 updates, but for clarity only the May 2021 changes to this document have been **highlighted and bolded** or ~~struck through in red text~~ to reflect the revised policies. Please contact info@designlights.org with any questions.

This version of the Manufacturer and Industry Guidance also contains corrections and clarifications made to the originally released document. For a full list of corrections and clarifications, please see our website here.
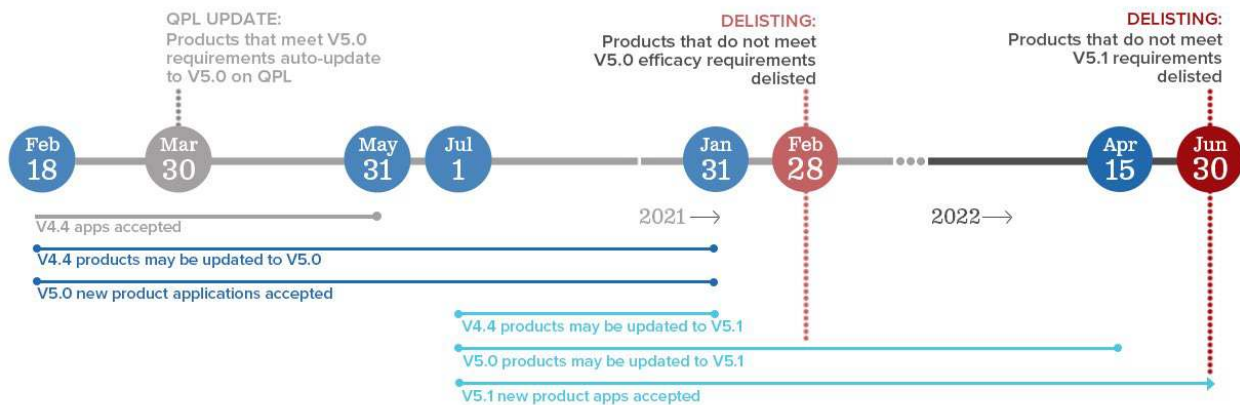
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Introduction

This document explains how the SSL V5.0 and V5.1 requirements are implemented and offers comprehensive information for manufacturers who wish to update their product listings during the grace periods.

Implementation Timelines and Grace Periods

The DLC recognizes that the V5.0 and V5.1 Technical Requirements result in the need to perform new testing and/or product design changes. As such, grace periods are in place to allow manufacturers time to comply with the new requirements.

In order to provide a reasonable and manageable transition process, this Version 5 release contains two policy documents, V5.0 and V5.1, each with independent implementation schedules. SSL V5.0 contains an efficacy increase and new Premium dimming performance requirements. SSL V5.1 aims to capture and promote continuing advances in quality of light attributes such as color performance, discomfort glare, and light distribution; and increases controllability requirements so that maximum energy savings and user benefits are realized.

A high-level timeline overview is shown below. **This timeline reflects the extended dates for submitting update applications for V5.0 products to V5.1 and the new V5.0 delisting date.**

Each of the grace periods have submission deadlines, as noted above. At the end of each grace period, the DLC will remove from the Qualified Product List (QPL) any product that does not comply with the criteria required at each milestone.

Manufacturers are encouraged to voluntarily delist products that they do not plan to update or that are no longer available. Products that have been delisted will still be searchable using the "Include De-Listed Products" filter on the DLC SSL QPL search page.

A summary of the implementation timeline is provided in **Table 1**.

Table 1: *Summary of V5.0/V5.1 Implementation Timeline*

Milestone	Date
Final V5.0 & V5.1 Technical Requirements released	February 14, 2020
V5.0 new product applications accepted	February 18, 2020
V5.0 update applications for V4.4 listed products accepted	February 18, 2020
Individual outreach sent to manufacturers (noting status of V4.4 listed products relative to V5.0)	February 20, 2020
Listed products that meet V5.0 requirements auto-update to V5.0 on the QPL	March 30, 2020
Deadline to submit products for qualification under V4.4 Technical Requirements	May 31, 2020
V5.1 new product applications accepted (new fee amounts apply)	July 1, 2020
V5.1 update applications for V4.4 or V5.0 listed products accepted (new fee amounts apply)	July 1, 2020
Deadline to submit V5.0 or V5.1 product update applications for V4.4 listed products	January 31, 2021
Products that do not meet V5.0 requirements delisted	February 28, 2021
Deadline to submit new products for qualification under V5.0 Technical Requirements	January 31, 2021
Deadline to submit V5.1 product update applications for V5.0 listed products	~~October 15, 2021~~ **April 15, 2022**
Products that do not meet V5.1 requirements delisted	~~December 31, 2021~~ **June 30, 2022**

Manufacturer Impact Notifications

The first round of individual outreach to manufacturers that communicates how their V4.4 listed products are impacted by V5.0 will take place on February 20, 2020 and will continue in periodic subsequent rounds during the remainder of 2020 (see details in the **Automatic Updating Timeline** section below). The DLC will strive to notify manufacturers of all impacted products, however, manufacturers are expected to understand their product listings and to update listings as needed. It is important that manufacturers keep the contact information for their account administrator up-to-date in the DLC Application Portal so the appropriate party receives these notifications. Contact information can be updated in the "Account Info" tab. You are your organizations' account administrator if the "Manage Users" tab is displayed when you are logged into your account.

If you are currently not listed as your organization's administrator but should be, please contact applications@designlights.org.

New Policy for Updating Reported Data of V4.4 Products

Starting on February 14, 2020, any request to change reported efficacy data that improves the reported efficacy performance of listed products must include both 1) an explanation of what has changed in the product from the time of original listing that results in improved efficacy, and 2) a new LM-79 for the worst-case efficacy model that the manufacturer is seeking to update within a given product family. Existing rules regarding limitations of relatable products within family groups and LM-79 accredited lab testing apply. These applications require a fee consistent with the number of LM-79 test reports per the Independent Test Report (ITRs) provision in the family grouping fee schedule. The DLC reserves the right to require additional information from applicants seeking to update their reported data throughout the transition to the V5.0 Technical Requirements.

Manufacturer Guidance for Implementation of V5.0

V5.0 includes an increase in efficacy requirements for most Primary Use Designations and new dimming requirements for DLC Premium products. As of April 28, 2020, the dimming requirements for V5.0 Standard have been removed and will be implemented in V5.1. The following sections describe the transition approach the DLC will take to process applications submitted under the V4.4 Technical Requirements and to transition and evaluate products under the V5.0 Technical Requirements.

This document refers to specific additions to the V4.4 SSL Technical Requirements. Any technical requirements not addressed explicitly within Technical Requirements V5.0 has not changed, and V4.4 requirements apply. Please see the DLC website for the complete set of V5.0 Technical Requirements.

Qualifying New Products Under V4.4

- Manufacturers may continue to submit products for qualification under the V4.4 Technical Requirements through **May 31, 2020**.
- Submitted V4.4 applications must complete the full comprehensive review by **July 31, 2020**. Any V4.4 application that contains open issues by close of business on July 31 will be closed.
- Products submitted on or after June 1, 2020 will only be added to the QPL if they meet the V5.0 Technical Requirements[1].

Qualifying New Products Under V5.0

- V5.0 new product applications will be accepted **February 18, 2020** through **January 31, 2021.**
- All products submitted for qualification on or after **June 1, 2020** will be subject to the V5.0 requirements and must use a V5.0 application.

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[1] Because products qualified as V4.4 Premium that do not meet V5.0 Premium will not be transitioned to V5.0 Standard until February 28, 2021, new Private Label applications submitted through January 31, 2021 may still include OEM products appearing on the QPL as V4.4 Premium as long as those products meet the V5.0 Standard requirements. These products will automatically transition from V4.4 Premium to V5.0 Standard on February 28, 2021.

Updating V4.4 Listed Products to V5.0

- On March 30, 2020, all listed products that meet the V5.0 requirements will be automatically updated on the QPL to reflect that they meet the Technical Requirements V5.0. This includes any child product that meets V5.0 based on the data the DLC has on record for each child product. **Products that will be automatically updated cannot submit update applications**. Eligible products will update per the timeline without any action necessary from the manufacturer. Each manufacturer's account administrator will be notified via email regarding which of their products are eligible for automatic update on February 20, 2020. Products that do not automatically update are required to submit update applications to demonstrate V5.0 compliance. **Additional rounds of automatic updating and notification will occur according to the Automatic Updating Timeline section below.**
- Products that do not meet the V5.0 requirements will remain on the QPL until the end of the V5.0 transition period (**February 28, 2021**), at which point they will be automatically delisted.
- Manufacturers may submit V5.0 update applications for products that do not meet the V5.0 requirements based on their current listed information starting on February 18, 2020.
- V5.0 update applications must be received by **January 31, 2021** and will be processed according to the published review timeframes. The DLC strongly encourages manufacturers to submit update applications as early as possible. Products within open applications will be subject to the **February 28, 2021** delisting, and will be added to the QPL under V5.0 upon full review completion. The full review of open applications must be completed by close of business on **March 31, 2021** or the applications will be closed.

Updating V4.4 Standard to V5.0 Standard

Products that meet the V4.4 Standard efficacy requirements but do not meet the V5.0 Standard efficacy requirements must be updated to meet the V5.0 Standard efficacy requirements to avoid delisting. An update application must be submitted by **January 31, 2021** to allow DLC reviewers to evaluate the new tested and reported data and update the QPL. Please reference the **New Policy for Updating Reported Data** section of this document for information on updating reported data only. Products not updated to V5.0 Standard will be delisted on **February 28, 2021**.

Updating V4.4 Premium to V5.0 Premium

Products that meet the V4.4 Premium requirements but do not meet the V5.0 Premium requirements must be updated to meet the V5.0 Premium requirements. If these products are not updated, they will be transitioned to V5.0 Standard or delisted if products do not meet the V5.0 Standard requirement at the end of the grace period on **February 28, 2021**. An update application must be submitted by **January 31, 2021** to allow DLC reviewers to evaluate the new tested and reported data and update the QPL. Please reference the **New Policy for Updating Reported Data** section of this document for information on updating reported data only. Products not updated to V5.0 Premium, but that do meet V5.0 Standard requirements, will be automatically transitioned to

V5.0 Standard on **February 28, 2021**. These products will be identified to manufacturers individually during the communications cycles noted in the **Automatic Updating Timeline** section below.

V4.4 listed Premium products that meet the V5.0 Premium efficacy requirement, *but are not qualified as dimmable*, must be updated to meet the V5.0 Premium dimming capability requirements. Case lighting and specialty hazardous products are excluded. Manufacturers must submit a **dimming update application** to change the dimming information on the QPL by **January 31, 2021**.

Due to the lack of an industry standard testing methodology to verify dimming capability and performance under dimmed conditions, the DLC will not require testing to be submitted to verify dimming performance at this time. The DLC will evaluate a manufacturer's claims of dimming capability by ensuring that the dimming claims are clearly published on the product specification sheet and correspond with the unique model numbers submitted. V4.4 Premium products that do not update their dimming capabilities to the V5.0 Premium requirements will be delisted (or transitioned from V4.4 Premium to V5.0 Standard) on **February 28, 2021**.

Updating V4.4 Premium to V5.0 Standard

Products that meet the V4.4 Premium requirements but do not meet the V5.0 Premium requirements will be transitioned to V5.0 Standard classification on **February 28, 2021**, as long as they meet the V5.0 Standard requirements. Manufacturers cannot submit individual applications to update listings from V4.4 Premium to V5.0 Standard, other than changes in efficacy performance of the products, as these transitions will happen automatically on **February 28, 2021**.

Updating V4.4 Private Label Products to V5.0

- Private label products are subject to the same qualification analysis as OEM products. Applications for products that do not meet V5.0 requirements must be submitted by **January 31, 2021**. **OEM product updates must be completed prior to submission of a Private Label update application.** Private labelers are encouraged to coordinate with their OEM suppliers to prevent delays.
- On **March 30, 2020**, all listed private label products that meet the V5.0 requirements will be automatically updated on the QPL to reflect that they meet the V5.0 Technical Requirements. This includes any child product that meets V5.0 based solely on the data DLC has on record for each child product. (See **Automatic Updating and Delisting Determination Details** section below for additional details).
- Private label products that do not meet the V5.0 requirements will remain on the QPL until the end of the V5.0 transition period (**February 28, 2021**), at which point they will be delisted.
- Private label and OEM rules not mentioned in the V5.0 and V5.1 policy documents remain the same as under V4.4.

- Manufacturers may submit V5.0 update applications for products that do not meet the V5.0 requirements based on their current listed information starting on February 18, 2020.
- Private label V5.0 update applications must be received by **January 31, 2021** and will be processed according to the published [review timeframes](#). Products within open applications will be subject to the **February 28, 2021** delisting, and will be added to the QPL under V5.0 upon full review completion. The full review of open applications must be completed by close of business on **March 31, 2021** or the applications will be closed.

Automatic Updating and Delisting Determination Details

The DLC will make a determination regarding whether a given V4.4 listed product meets the V5.0 Technical Requirements **based on the data the DLC has on record for each product.** This means that the "reported[2]" efficacy data on the QPL for "child[3]" products will be sufficient to demonstrate compliance with the V5.0 efficacy levels.[4] Similarly, the reported dimming status and dimming type information will be used to determine whether a given product is compliant with the V5.0 dimming requirements.

For "parent[5]" products, determination of compliance with V5.0 will be made on the basis of both the tested data and the reported data for a given product. Both tested and reported efficacy data must pass the V5.0 efficacy requirements.

This approach will limit the impact of the V5.0 transition and minimize the number of products that will be delisted in the V4.4 to V5.0 transition. Additionally, the following categories have special circumstances that will be approached in the following ways:

- **Linear replacement lamps (TLEDs) and four pin-base replacement lamps for CFLs (CFLEDs):** For each of these lamp categories, the Technical Requirements include both a bare-lamp efficacy performance requirement and a minimum efficacy performance requirement for a reference luminaire with the lamp installed ("in-luminaire efficacy"). Because this in-luminaire efficacy was only collected on parent products, and both test data and reported data on the QPL represents bare-lamp performance, determination of all child products' compliance will be made on the bare-lamp performance only.
  - For parent four pin-base replacement lamps for CFLs, both the bare-lamp and in-luminaire test data and the bare-lamp reported data will be compared against V5.0 requirements.

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[2] Also referred to as "rated" data or "scaled" data at times.
[3] "Child" products refer to products for which test data is not listed on the QPL. This is as opposed to "parent" products, which do have test data listed.
[4] Please note that this approach is restricted to products already on the QPL under the V4.4 Technical Requirements. New applications for listing under the 5.0 requirements must have bracketing test data for parent products, as has historically been the case.
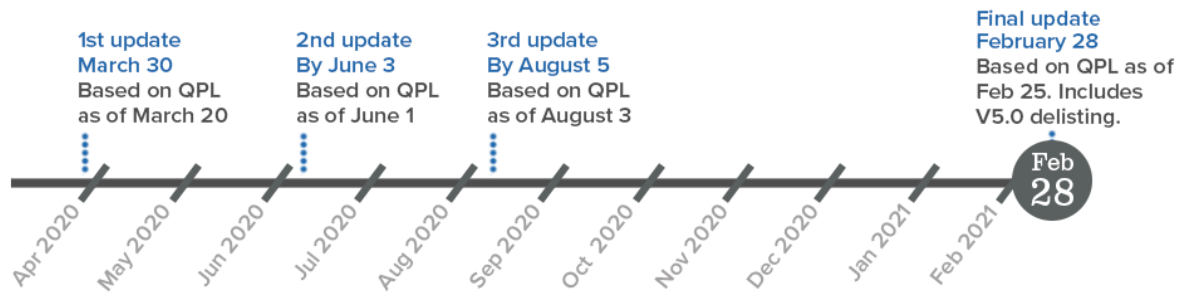[5] Products for which test data is listed on the QPL. Note that these products have both tested and reported data.

- o For parent linear replacement lamps, only bare-lamp tested and reported data will be evaluated against V5.0 requirements, understanding that under V5.1 in-luminaire testing will not be required.

- **Non-cutoff and Semi-cutoff Wall-Mounted Area Luminaires:**
Luminaires in these Primary Use Designations must demonstrate compliance with the efficacy requirements when considering only the lumens emitted in the 0-90 degree zone. However, since child products do not have zonal lumen information, reported efficacy values (which are full-efficacy values, not just efficacy in the relevant zone) will be scaled by the percentage of light output in the 0-90 degree zone of the product in the group. In the case where there are multiple parent products with varying distributions (that is, different percentages of lumens being emitted in the relevant zone), the best-case zonal distribution of any parent (that is, highest percentage of lumens 0-90) will be assumed and applied to child products. This, again, will limit the impact of the V5.0 transition. This approach will not extend to new applications submitted under V5.0 and will not extend to V5.1 at all but is being taken for simplicity in the automatic transition of previously listed products to V5.0.

Automatic Updating Timeline

Evaluation of products listed on the QPL under V4.4 will be conducted and communicated individually to affected manufacturers at several points throughout 2020. The QPL will be automatically updated to reflect products listed products that are compliant with V5.0 four times throughout the year. The details are as follows. This timeline reflects updated dates based on the November 2020 update to this document.

Initial Assessment and Notification of Product Status

- An initial assessment of the status of listed products was made based on the QPL as of February 10, 2020. The results of this assessment will be distributed individually to manufacturers on **February 20, 2020**. This communication will include DLC's determination of:
  - Products that are eligible for automatic updating to V5.0 and will be automatically updated in the first automatic updating event on March 30, 2020.
  - Products that are not eligible for automatic updating to V5.0 based on current listing.
    - It is required that these products submit an update application to manually update to V5.0 by close of business on **January 31, 2021** or they will be delisted (or downgraded from V4.4 Premium to V5.0 Standard, as appropriate) on **February 28, 2021**.

First Automatic Update (March 30, 2020)

- The first automatic updating event will occur on March 30, 2020. On this date, any products eligible to be transitioned from V4.4 Standard to V5.0 Standard, or from V4.4 Premium to V5.0 Premium, will be updated on the QPL. QPL listings will publicly display the new Technical Requirements version and classification.
  - Products that were previously listed as V4.4 Premium, but which are not compliant with V5.0 Premium, will remain listed as V4.4 Premium at this time.
  - This updating event will cover all products listed on the QPL as of March 23, 2020. A reminder will be sent out on March 30 alerting manufacturers that they can now check their products' status relative to V5.0 on the QPL.

Second Automatic Update (by June 3, 2020)

- A second round of analysis, communication, and automatic updating will coincide with the close of the V4.4 application acceptance window.
    - o Analysis will be based on the QPL as of June 1, 2020. This update will cover additional products qualified under V4.4 between March 23 and June 1, 2020.
    - o Communication of the results of analysis and automatic updating of products will take place by June 3, 2020.
    - o Similar to the first round, updates will be made for V4.4 Standard to V5.0 Standard, and for V4.4 Premium to V5.0 Premium. Products listed as V4.4 Premium, but which do not meet the V5.0 Premium Requirements will remain as V4.4 Premium at this time.
    - o As of April 28, 2020, the dimming requirements for V5.0 Standard have been removed and will be implemented in V5.1. Products that were not updated to V5.0 due to not meeting the original dimming requirements will be updated during this second automatic update.

Third Automatic Update (by August 5, 2020)

- A third round of analysis, communication, and automatic updating will coincide with the close of the V4.4 application processing window.
    - o Analysis will be based on the QPL as of August 3, 2020. This update will cover additional products qualified under V4.4 between June 1 and July 31.
    - o Communication of the results of analysis and automatic updating of products will take place by August 5, 2020.
    - o Similar to the first two rounds, updates will be made for V4.4 Standard to V5.0 Standard, and for V4.4 Premium to V5.0 Premium. Products listed as V4.4 Premium, but which do not meet the V5.0 Premium Requirements will remain as V4.4 Premium at this time.
    - o **As of July 31, no additional V4.4 products will be added to the QPL.** Any additional updates to V4.4 listed products desired by manufacturers must be done via an update application from this point forward. Update applications from V4.4 to V5.0 must be submitted by the end of the day on **January 31, 2021**.

Final Automatic Update (February 28, 2021)

- A final courtesy reminder regarding product updates will be distributed in late September. Manufacturers will be able to reference their QPL listings directly at this point to determine compliance with V5.0.
- A final round of analysis and automatic updating will occur at the end of **February** and a final round of communication will occur in the beginning of **March 2021**.
    - o A final analysis will be done based on the QPL on **February 25, 2021**. This will determine the final status of all products on the QPL as to whether they will be transitioned or delisted on **February 28, 2021**.
    - o Communication of these results will be sent out individually to manufacturers by **March 4, 2021**. This communication will include:

- Products that that had their QPL listings update from V4.4 Premium to V5.0 Standard as of **February 28, 2021**.

- Products that were delisted from the QPL, and are no longer considered qualified, as of **February 28, 2021**.

  o As of **March 1, 2021**, only products compliant with the V5.0 efficacy and dimming requirements will be listed on the QPL.

- Manufacturers whose products are delisted on **February 28, 2021** and have not submitted an update application by **January 31, 2021** `will be required to submit a complete new application to relist products under V5.1.

Manufacturer Guidance for Implementation of V5.1

V5.1 continues to capture advances in lighting quality characteristics such as color performance, discomfort glare, and light distribution; and increases the controls functionality of installed energy efficient technology so that maximum energy savings and user benefits are realized. As of April 28, 2020, the dimming requirements for V5.0 Standard have been removed and will be implemented in V5.1. The following sections describe the transition approach the DLC will take to transition to and evaluate products under the V5.1 Technical Requirements.

Manufacturers may submit applications for listing new products under V5.1 and may update V4.4 and V5.0 products to V5.1 starting on July 1, 2020. All products qualified under V5.0 must be updated to V5.1 in order to remain listed on the QPL after ~~December 31, 2021~~ **June 30, 2022**. V5.0 to V5.1 update applications must be submitted by ~~October 15, 2021~~ **April 15, 2022** in order for the full review to be completed by ~~December 15, 2021~~ **June 16, 2022** in preparation for the ~~December 31, 2021~~ **June 30, 2022** delisting date.

This document refers to specific additions to the V4.4 and V5.0 SSL Technical Requirements. Any technical requirements not addressed explicitly within Technical Requirements V5.1 has not changed, and V4.4/V5.0 requirements apply. Please see the DLC website for the complete set of V5.1 Technical Requirements.

Qualifying New Products Under V5.1

- V5.1 new product applications will be accepted beginning on July 1, 2020.
- All products submitted for qualification after **January 31, 2021** will be subject to the V5.1 Technical Requirements.

Updating Listed Products to V5.1

- All currently-qualified products must be updated to meet the V5.1 Technical Requirements or they will be delisted from the QPL at the end of the V5.1 grace period on ~~December 31, 2021~~ **June 30, 2022**.
    - If updating a V4.4 listed product to V5.1, the update application must be submitted by **January 31, 2021**.
    - If updating a V5.0 listed product to V5.1, the update application must be submitted by ~~October 15, 2021~~ **April 15, 2022**.

- Manufacturers may submit V5.1 update applications starting on July 1, 2020.
- There will be no "automatic updating" for products to V5.1. Every product a manufacturer wishes to update to V5.1 must be included in an update application.

Updating V4.4 Listed Products to V5.1

- Manufacturers may submit applications to update V4.4 listed products directly to the V5.1 Technical Requirements starting on July 1, 2020.
- Manufacturers wishing to update directly from V4.4 to V5.1 must update the efficacy and dimming capabilities of their products as well as provide all required V5.1 testing and controllability reporting.
- V4.4 to V5.1 update applications must be received by **January 31, 2021** and will be processed according to the published review timeframes. Products within open applications will be subject to the **February 28, 2021** delisting, and will be added to the QPL under V5.1 upon full review completion. The full review of open applications must be completed by close of business on **March 31, 2021** or the applications will be closed.

Updating V5.0 Listed Products to V5.1

- Manufacturers may submit applications to update V5.0 listed products to the V5.1 Technical Requirements starting on July 1, 2020.
- All products qualified as V5.0 must be updated to V5.1 in order to remain listed on the QPL after ~~December 31, 2021~~ **June 30, 2022**.
- If updating from V5.0 to V5.1, update applications must be submitted by ~~October 15, 2021~~ **April 15, 2022** and full review completed by ~~December 15, 2021~~ **June 16, 2022** in preparation for ~~December 31, 2021~~ **June 30, 2022** delisting date when products that aren't qualified as V5.1 will be delisted from the QPL.

Deadline to Submit New V5.0 Applications

Manufacturers may continue to submit products for qualification under the V5.0 Technical Requirements through January 31, 2021.

Updating Previously Qualified Private Label Products to V5.1

- Private Label products must be updated to comply with the V5.1 Technical Requirements.
- **OEM product updates must be completed prior to submission of a V5.1 private label update application.** Private label and OEM rules not mentioned in the V5.0 and V5.1 policy documents remain the same. Private labelers are encouraged to coordinate with their OEM suppliers to prevent delays.
- Private label products that do not meet the V5.1 Technical Requirements will remain on the QPL until the end of the V5.1 transition period (December 31, 2021 **June 30, 2022**), at which point they will be delisted.
- Manufacturers may submit V5.1 update applications starting on July 1, 2020.
- Update applications must be received by October 15, 2021 **April 15, 2022** and full review completed by December 15, 2021 **June 16, 2022** in preparation for the December 31, 2021 **June 30, 2022** delisting date.

Testing Products for V5.1

An example of the typical required testing and reporting required under V5.1 for a family of products is provided below in **Table 2**. Specific testing and reporting requirements for each of the Technical Requirements can be found in the corresponding sections of the V5.1 policy.

Table 2: Summary of typical V5.1 Testing Requirements

Criterion	Which Model(s)	Test Required
Minimum Light Output	Worst case light output	LM-79/color report (full test report that includes color and spectral data), including accompanying .SPDX document. Note: A single full LM-79/color report may fulfill multiple criterion.
Minimum Efficacy	Worst case efficacy	
Max CCT	Highest CCT in family at lowest color rendition option	
Min CCT	Lowest CCT in family at lowest color rendition option	
Minimum Color Rendering	Lowest color rendition option in family	
Chromaticity	Lowest CCT at lowest color rendition option	
	Highest CCT at lowest color rendition option	
	Lowest CCT at highest color rendition option (Premium only)	
Minimum L_{70} Lumen Maintenance (L_{90} for Premium)	ISTMT at worst case thermal conditions of LED, LM-80 for single LED package/module/array as required for Lumen Maintenance projection	ISTMT
		LM-80/LM-84
		TM-21/TM-28
Color Maintenance	LM-80 for single LED package/module/array that is evaluated for Color Shift	LM-80/LM-84

Driver ISTMT (Premium)	Worst case Driver Temperature for each unique driver	ISTMT
Zonal Lumen Distribution/Spacing Criteria	Each unique optical and distribution pattern	Tested LM-79/distribution report, including accompanying IES file
BUG Ratings (outdoor only)	Each unique optical and distribution pattern	Tested LM-79/distribution report, including accompanying IES file
UGR (specific Indoor PUDs and premium only)	Each unique optical and distribution pattern at the highest lumen output without consideration of the effect of color properties	Tested LM-79/distribution report, including accompanying IES file
THD/PF	Worst case performing driver in family	Benchtop Electrical Testing

The following sections provide detail on testing requirements for V4.4 to V5.1 update applications, V5.0 to V5.1 update applications, and meeting the additional V5.1 requirements in new product applications. Please see the DLC Technical Requirements Table for complete requirements.

V5.1 Worst Case Photometric Testing Requirements

The manufacturer must provide a **full LM-79/color report** for the product with the minimum light output and minimum efficacy. A "full LM-79/color report" must include, but is not limited to, the following:

- Electrical characteristics (Wattage, Input Voltage, THD, and PF)
- Total luminous flux
- Efficacy
- Chromaticity ((x,y) and (u',v'))
- CCT and Duv
- ANSI/IES TM-30-18 Full Report (per Annex D, Figure D-3)
- CIE 13.3-1995 complete Color Rendering Index Detail
- Accompanying .SPDX document (IES TM-27-14) with spectral power distribution data from 380-780 nm in ≤5nm increments

All information listed above, except the accompanying .SPDX document, must be included in a single LM-79 test report. Separate ANSI/IES TM-30-18 reports will not be accepted.

V5.1 Color Rendition and Chromaticity (CCT & Duv) Testing Requirements (Standard Classification)

- For product families that offer one or more CCT option(s) and one color rendition option, a full LM-79/color report must be provided at the lowest and highest CCT options offered.
- For product families that offer one or more color rendition option(s) and one CCT option, a full LM-79/color report must be provided at the minimum color rendition option for the CCT option offered.

- For product families that offer one or more color rendition option(s) and more than one CCT option, a full LM-79/color report must be provided for the lowest and highest CCT options offered, at the minimum color rendition option.
- Please note that testing conducted on the worst-case efficacy variation is likely the combination of lowest CCT and highest color rendition.
- For all above scenarios, the minimum color rendition option must meet either (Option 1) the IES TM-30-18 color rendition requirements or (Option 2) the CIE 13.3-1995 color rendition requirements for both the highest and lowest CCTs, and both sets of color rendition measures must be measured and reported.
- The chromaticity coordinates must fall within at least one of the basic or extended nominal, 7-step quadrangle CCTs from 2200K – 6500K as defined by ANSI C78.377-2017.

V5.1 Color Rendition and Chromaticity (CCT & Duv) Testing Requirements (Premium Classification)

In addition to the test report and implementation requirements for DLC Standard qualification, a **full LM-79/color** report for the maximum color rendition option at the lowest CCT option is required for the Premium classification.

- All color rendition options must 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**, however both sets of color rendition measures must be measured and reported.
- All variations of CCT offered must 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 2200K to 6500K as defined by ANSI C78.377-2017.

V5.1 Color Maintenance Testing Requirements for all Classifications

- **Color Maintenance Option 1:**
  - An LM-80 report for the LED package/module/array used within the product must be provided and shall include chromaticity data for at least 1000-hour and 6000-hour time intervals. If the LM-80 report uses uneven test intervals, the closest measurement points below the 1000-hour measurement point (<1000 hours) and beyond the 6000-hour measurement point (>6000 hours) will be referenced for evaluation of color maintenance. Additionally, color maintenance will be evaluated against the appropriate LM-80s 55°C data set, or the lowest temperature data set provided that is greater than 55°C, if there isn't a 55°C data set available.
- **Color Maintenance Option 2:**
  - Luminaire-level performance data that follow LM-84 test procedures for the product must be provided and shall include chromaticity data for at least 1000-hour and 6000-hour time intervals.
  - Due to the length of this type of testing, it is recommended that the submitter contact the DLC at applications@designlights.org to ensure the testing plan will align with DLC

testing and reporting requirements before beginning any testing using the LM-84 method.

- In the case that average chromaticity coordinate data at the ≈1000-hour and ≈6000-hour measurement points are not provided and only chromaticity shift (Δu'v') data is available, the DLC will assume the worst-case shift between these two measurement points. To clarify, the DLC will assume the ≈1000-hour and ≈6000-hour measurement points represent color shifts in opposite directions and will add the two reported chromaticity shift values to ensure that the worst-case shift meets the appropriate color maintenance requirement.

V5.1 Back Light, Uplight and Glare (BUG) Testing Requirements

For applicable primary use designations, a **full LM-79/distribution report** must be provided for each unique optical and distribution pattern within the family without consideration of lumen package and the effect of color properties.

A "full LM-79/distribution report" shall include, but is not limited to, the following:

- Electrical characteristics (Wattage and input voltage)
- Luminous intensity distribution (Candela array)
- .ies file (ANSI/IES LM-63-02(R2008)) based on the LM-79 test data conforming to the Additional Reporting Requirements in the V5.1 policy.

V5.1 Discomfort Glare Testing Requirements (Premium)

Provisions for discomfort glare apply to products in the Troffer, Linear Ambient, High-Bay, and Low-Bay luminaire categories, and the Integrated Retrofit Kit for Troffers, Retrofit Kits for Linear Ambient, Retrofit Kits for High-Bay, and Retrofit Kits for Low-Bay categories.

For eligible products that need to meet the UGR requirements, a **full LM-79/distribution report** must be provided per the **Additional Reporting Guidelines** 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.

A "full LM-79/distribution report" shall include, but is not limited to, the following:

- Electrical characteristics (Wattage and input Voltage)
- Luminous intensity distribution (Candela array)
- .ies file (ANSI/IES LM-63-02(R2008)) based on the LM-79 test data conforming to the **Additional Reporting Guidelines** in the V5.1 policy.

The UGR bin that the product's Corrected UGR value falls in must be selected in the application form.

Manufacturers must also report the dimensions of products in the Troffer, Linear Ambient, High-Bay, and Low-Bay general applications in either the spec sheets, LM-79/distribution report or other supplemental documentation.

V5.1 Controllability Reporting Requirements

Under V5.1, most products are required to be dimmable. Manufacturers with listed outdoor or lamp products that are not dimmable, excluding landscape accent/flood, specialty sports flood and specialty hazardous products, must update the dimming capabilities of their products.

- The dimming type for outdoor luminaires and retrofit kits may be either continuous or stepped.
- The dimming type for indoor lamps (linear replacement lamps, mogul screw-base (E39/E40) replacements for HID lamps, four pin-base replacement lamps for CFLs) must be continuous.
- All products pursuing the DLC Premium designation must be capable of continuous dimming (lamps and specialty Primary Use Designations are not eligible for DLC Premium).

Due to the lack of an industry standard testing methodology to verify dimming capability and performance under dimmed conditions, the DLC will not require testing be submitted to verify dimming performance at this time. The DLC will evaluate a manufacturer's claims of dimming capability by ensuring that the dimming claims are clearly published in the product specification sheet and correspond with the unique model numbers submitted.

In order to meet the V5.1 controllability requirements, manufacturers must include all available controls options in the luminaire's spec sheets/marketing materials/instruction manuals, etc. These control options include Occupancy/Vacancy Sensing, Daylight Sensing, Multifunction Sensing (Occupancy + Daylight), High-end Trim, Energy Monitoring, LLLC, Traffic Sensing, Exterior Photocell, Networked Replacement Lamp, and Integral Sensor Receptacle. Multiple options are permitted.

Manufacturers must also report the control signal communication type and dimming protocol in their spec sheets/marketing materials/instruction manuals, etc. The communication type may be either wired or wireless. Wired protocols include 0-10V, DALI, DMX, Phase-cut, or other wired options. Wireless protocols include Zigbee, Bluetooth, Wi-Fi, or other wireless options. Multiple options are permitted.

V5.1 IES TM-21-11 Requirements

Long term lumen maintenance projections will be accepted only if fully compliant with TM-21-11 and its Addendum B. This includes, but is not limited to, the following:

- Luminous flux data collection and selection (section 4.3)
- Data used for the curve-fit (section 5.2.3)
- Temperature data interpolation (section 6.0)
- Limit for Extrapolation (section 6.5)

Please note that the DLC is making an exception to allow uneven interval reporting for TM-21 projections drawing from an LM-80 report initiated prior to March 31, 2015, one year after the introduction of even intervals in Addendum A to TM-21. Otherwise, TM-21 projections that are not fully compliant with Addendum B revisions will not be accepted. A complete and accurate copy of the June 18, 2018 version of the ENERGY STAR TM-21 calculator is required for submission, and will suffice in meeting the above requirements, unless uneven interval reporting is used for TM-21 projections. In the case where uneven intervals are used, the February 08, 2016 version of the ENERGY STAR TM-21 calculator must be used. In no case will the DLC allow uneven intervals of <250 hours.

Additionally, under V5.1, the DLC will require LM-80 sets to be sufficient for projecting to 50,000 hours via TM-21 rules alone in order to demonstrate compliance with the L_{70} lumen maintenance requirement. Products with LM-80 sets insufficient to do so will be ineligible for qualification. To clarify, projections shall not extend beyond 6 times the test duration for 20 or more samples (5.5 times for 10 to 19 samples).

- For example, LM-80 sets used to project to 50,000 hours are required to demonstrate a test duration of ≥ 8,333.33 hours for 20 or more samples. 6,000 hours of test data will no longer be accepted.

Application Fee Changes

The following changes to the application fees will be effective July 1, 2020. All applications invoiced on or after July 1, 2020 will reflect the new fees, regardless of the submission date of the application or Technical Requirements version the application is submitted under. All fee categories not addressed below will not change. Please refer to the DLC application fees webpage for the complete list of fee categories.

Table 3*: Updated Fee Structure*

Application Type	Item	July 1, 2020 Fee
Single Product	Single Product Application Fee	$750
Family Grouping	Independent Test Reports (ITRs)	$375
Family Grouping	Additional product family members	$30
Private Label	Independent Test Reports (ITRs)	$325
Private Label	Additional product family members	$30

- Independent test reports (ITRs) include full LM-79/color reports, LED ISTMT, and Driver ISTMT report types. Full LM-79/distribution reports are not considered ITRs.
- Additional product family members are calculated as: **total products in the group – number of ITRs = additional family members.**
- Private label application fees are based on the number of ITRs of the original product application.
- For updating listed products, in general, the cost is consistent with the fees in **Table 3** above. Appropriate fees will be assessed based on new test reports that must be evaluated, and for additional family members being added to any family group. This applies to all update applications.

Impact to Processing Timeframes

All V4.4 and V5.0 applications will be completed within the existing application processing timeframes. Due to additional testing and reporting requirements for V5.1 applications, processing timeframes for V5.1 applications have increased to account for the additional necessary review time. **Table 4** below shows V5.1 application timeframes.

Table 4: V5.1 Application Processing Timeframes

Application Type	Initial Review	Comprehensive Review
Single Product	9 Business Days	7 Business Days
Family Grouping	9 Business Days	10 Business Days
Private Label	6 Business Days	6 Business Days
Product Updates	9 Business Days	10 Business Days

V5.1 new product applications submitted between **January 31, 2021** and **February 28, 2021** will have extended review timeframes and will be processed according to available resources in order to prioritize applications to update V4.4 products to V5.0 and V5.1 **and applications to qualify new V5.0 products**.