

How to complete the DLC® Horticultural Fixture Web Application

The DLC Horticultural Fixture Web Application Form is split into several sections to simplify both the application and review process. To begin the application process, please sign in or register for a manufacturer account at designlights.org/my-account and begin a new application for a Horticultural Product.

Application reviewers will round all numerical values to two (2) decimal places when checking entered values against third-party test reports.

All test reports, unless otherwise mentioned, are expected to be in LM-79-08 format. Once ANSI/ASABE ES-311 S642 is widely available in the testing facility infrastructure, the DLC will begin requiring reports in that format after a sufficient public notice period.

- **Section 1: Product Information**

This section collects basic identifying information about the product.

Specification Sheet – Upload the most current version of the product’s specification sheet. Please note that if the DLC Horticulture logo is included on a product that is not yet approved, your reviewer will hold processing until you provide an updated document without the logo.

Marketing Brochure – Upload a marketing brochure for the product. This will be used by your reviewer to understand the context of other product performance information, and can help save time in clarifying any questions they may have.

Brand Name – Enter the name of the brand your product is sold under. This may be your name as a manufacturer, or may be a specific brand name. Please note that this brand name will appear on the QPL.

Product Name – Enter the name of the product as it is commonly marketed and sold. This may or may not be distinct from your manufacturer or brand name, and is at your discretion. Please note that this name will appear on the QPL, if used.

Model Number – Enter the model number of the product as it is commonly marketed and sold. Please note that this model number will appear on the QPL.

Intended Use – Enter the intended usage of the product in a horticultural setting. For example, “sole-source”, “supplemental”, and “intra canopy” are common applications. This *will not* appear on the QPL, and is for the DLC’s use in understanding product trends to support potential future segmentation of the QPL beyond a single category.

- **Section 2: General Function**

This section collects basic operating parameters of the product.

Input Voltage Range – Enter the minimum and maximum input voltage range of the product. If there are separate drivers that allow a wider total range, use the global minimums and maximums of the entire set. For example, a product with a driver option capable of 120-277VAC input, and another driver option capable of 347-480VAC input would report a range of 120-480VAC. If there is only a single input voltage, then enter the same value for both fields. For example, a product with a driver capable of only 120VAC input would use "120" as both inputs.

Tested Voltage – Enter the tested voltage of the fixture in the accompanying third-party whole-fixture test reports. This will need to be the “worst-case” voltage in efficacy terms, and will be that voltage, across all input voltage ranges for all driver options, in which the product’s operation at full power will be at its lowest efficacy. You will also need to attach a document in a separate question for reporting the in-house, “benchtop” testing that supports this claim in the following question, "Tested Driver Benchtop Report".

Tested Driver Benchtop Report – Upload a document that lists all drivers that are available in this product, and the results of "benchtop" (i.e. measurements that may be done by a manufacturer that are not from a certified testing lab) testing of these drivers at the product's maximum rated power load at the minimum and maximum input voltages for each of these drivers. This test report must show, at each input voltage condition, the following values: consumed "wall plug" power, electrical efficiency (driver power output divided by driver "wall plug" power consumed, power factor, and total harmonic distortion (current). Your reviewer will ensure that any third-party test reports are performed at the voltage associated with the worst-case (lowest) electrical efficiency.

Warranty Documentation – Attach a copy of the product’s warranty terms and conditions. The DLC’s warranty requirements require a duration of at least five years, and disallow the exclusion of key components from the warranty, like lenses, drivers, and LEDs.

Is the Product Dimmable? – Enter a “yes” or “no” answer to report if the product can dim its output via any control method. This is *not* the area in which spectral tuning characteristics are reported.

Safety Organization – Enter the name of the safety organization that has certified the product’s safety when used for horticultural applications.

Safety File / Record Number – Enter the identifying information of the specific safety organization report or directory in which the reviewer can verify the product’s approval by the safety organization.

Attach Safety Documentation – Attach evidence of safety certification. This can be a Certificate of Compliance, ATM, NoA, or other document provided by your safety organization. It must include reference to the safety organization, and File or Record identifier. Please refer to the safety organization requirements in the Technical Requirements. If the safety organization that

has certified your product is not listed, please contact horticulture@designlights.org prior to submission.

Maximum Fixture Ambient Temperature – Enter the highest ambient temperature (°C) in which the product can operate. This will be used for validating various component longevity projections, and will be validated against information on the spec sheet.

- **Section 3: Photon Flux and Electrical Characteristics**

This section collects information about the performance of the product in the highest-power designed state, at the worst-case input voltage for efficacy. All values may be rounded to two (2) decimal places.

Attach “All-on” Photon Flux Test Report – Attach the report (PDF) from the third-party test lab with all photon flux and power values described below for verification. For dimmable or tunable products, this is the test report of the product at its maximum power state.

Testing Lab Name – Photon Flux – Enter the name of the testing lab that generated the LM-79 test report referenced here.

Photosynthetic Photon Flux – Enter the total photon flux in $\mu\text{mol/s}$ in the 400-700nm range for the product. This value must explicitly appear in the uploaded test report.

Photon Flux, Blue – Enter the total photon flux in $\mu\text{mol/s}$ in the 400-500nm range for the product. This value must explicitly appear in the uploaded test report.

Photon Flux, Green – Enter the total photon flux in $\mu\text{mol/s}$ in the 500-600nm range for the product. This value must explicitly appear in the uploaded test report.

Photon Flux, Red – Enter the total photon flux in $\mu\text{mol/s}$ in the 600-700nm range for the product. This value must explicitly appear in the uploaded test report.

Photon Flux, Far Red – Enter the total photon flux in $\mu\text{mol/s}$ in the 700-800nm range for the product. This value must explicitly appear in the uploaded test report.

Input Power, Watts – Enter the total power consumption, in watts, for the product. This value must explicitly appear in the uploaded test report.

Photosynthetic Photon Efficacy (PPE) – Enter the Photosynthetic Photon Efficacy, in $\mu\text{mol/J}$, for the product. This value must explicitly appear in the uploaded test report. Efficacy must be no lower than 1.9 $\mu\text{mol/J}$, less a 5% measurement tolerance.

Power Factor – Enter the worst-case (lowest) power factor (ex. “0.94”) found in all drivers’ operating modes during the driver in-house, “benchtop” testing at the full operating power state. This value must explicitly appear in the uploaded test report. With tolerances, this value must be between 0.87 and 1.0.

Total Harmonic Distortion, Current – Enter the worst-case (highest) THDi (ex. "0.15") found in all drivers' operating modes during the driver in-house, "benchtop" testing at the full operating power state. This value must explicitly appear in the uploaded test report. With tolerances, this value must be between 0.0 and 0.25.

Attach Spectral Quantum Distribution Image – Attach a static, 300x300 pixel summary image in .jpg format of the product's spectral quantum distribution from 400-800nm that was collected in the test report. This will be available for users of the QPL to display a basic visual summary of available spectrum.

Attach Photosynthetic Photon Intensity Distribution Image – Attach a static, 300x300 pixel summary image in .jpg format of the product's photosynthetic photon intensity distribution that was collected in the test report. This will be available for users of the QPL to display a basic visual summary of light distribution by angle in the 400-700nm range.

- **Section 4: Flux Maintenance, LM-80-Based**

This section collects data on LM-80 (i.e. LED device)-based flux maintenance projections for the product. Each PPF-producing LED device used in the product must independently pass a Q90 threshold of no less than 36,000 hours. For multiple LED devices, enter a complete set of required information via the Question Set mechanism included in this section.

Device-based Projection – Answer "yes" if you plan to demonstrate flux maintenance with LED-device based projections, then answer the remaining questions in this section. If you answer "no", then please proceed to the next section to demonstrate flux maintenance with whole-fixture based projections.

LED Spec Sheet – Attach the spec sheet for the specific LED device which you are characterizing.

LED Manufacturer – Enter the name of the manufacturer for each LED package/module/array.

LED Package/Module/Array Part Number – Enter the part number for the specific LED package/module/array you are describing in this entry.

Device Flux Within PPF Band – Is this an LED device with at least 25% of its per-device flux output in the PPF (PAR) band? If Yes, then please complete the rest of the questions here pertaining to PPF maintenance. If No, then please advance to the Far Red part of this section below and leave PPF answers blank.

LM-80 Report, PPF – Attach the LM-80 report (PDF) showing the flux maintenance of the LED device in the PPF band.

Name of LM-80 Test Lab – Enter the name of the test lab which generated this LED device's LM-80 report.

LED Drive Current (mA) – Enter the maximum drive current, in milliamps, at which you are driving the LED device in your product. If you are using a Chip-on-Board package/array in your product, please include both the drive current for the array (X) and the calculated current-per-die (Y), in the following format: "X, Y".

ISTMT Report – Attach the In-Situ Temperature Measurement Test (ISTMT) report (PDF). It must display the highest temperature that an LED of this model will experience in the fixture, at the maximum drive current it will experience, when the fixture is at its maximum rated ambient temperature. This maximum ambient temperature condition can be directly measured, or inferred via appropriate methods, by the ISTMT Lab.

Name of ISTMT Lab – Enter the name of the test lab which generated this LED device's In-Situ Temperature Measurement Test (ISTMT).

LED ISTMT Temperature (°C) at Max Ambient Temp – Enter the temperature that the LED device will experience at the maximum drive current when operating at an ambient temperature no lower than the maximum ambient environmental temperature on the product spec sheet. This maximum ambient temperature condition can be directly measured, or inferred via appropriate methods, by the ISTMT Lab.

TM-21 Report, PPF – Attach the completed TM-21 report for the PPF-based LM-80 and ISTMT.

Q90 Time, in Hours, PPF – Enter the time, in hours, in which the PPF is 90% of its initial value. This must be the same as cell I42 in the attached TM-21 report. This must be at least 36,000 hours. **If the time is derived from a non-PPF flux maintenance test and converted, enter an asterisk (*) after the last digit.**

PPF-denominated Maintenance Conversion – If PPF-denominated flux maintenance is adapted from non-PPF data (lumens, watts, et al), upload detailed technical justification of the conversion factors to PAR units used in the TM-21 and LM-80 reports.

Fixture Flux Within Far Red Band – Does your product emit at least 5% of its 400-800nm flux in the 700-800nm band? You will need to report the flux maintenance of this Far Red band for LED devices that materially contribute to this total. If "Yes", then continue to the next question. If "No", then you are finished with this section. Please save and continue.

Device Flux Within Far Red Band – Is at least 25% of the per-LED device flux in the Far Red band? You will need to report its flux maintenance in this band. If "Yes", then continue with the rest of this section. If "No", then you are finished with this section, and can save and continue to the next section.

LM-80 Report, Far Red – Attach the LM-80 report (PDF) showing the flux maintenance of the LED device in the Far Red (700-800 nm) band.

TM-21 Report, Far Red – Attach the completed TM-21 report for the Far Red band.

Q90 Time, in Hours, Far Red – Enter the time, in hours, in which the Far Red flux is 90% of its initial value. This must be the same as cell I42 in the attached TM-21 report. **If the time is**

derived from a non-Far Red flux maintenance test and converted, enter an asterisk (*) after the last digit.

Non-far-red-flux Maintenance Conversion – If far red-denominated flux maintenance is adapted from non-far-red data (lumens, watts, et al), upload detailed technical justification of the conversion factors to PAR units used in the TM-21 and LM-80 reports.

- **Section 5: Flux Maintenance, LM-84-based**

This section collects data on LM-84 (i.e. entire fixture)-based flux maintenance projections for the product.

Product-based Projection – Answer “yes” if you plan to demonstrate flux maintenance with fixture-based projections, then answer the remaining questions in this section. If you answer "no", then save and continue to the next section.

LM-84 Report, PPF – Attach the LM-84 report, in PPF units, for the product.

Name of LM-84 Test Lab – Enter the name of the test lab which generated this product’s LM-84 report.

TM-28 Report, PPF – Attach the TM-28 report, in PPF units, for the product.

Q90 Time, in Hours, PPF – Enter the time, in hours, in which the PPF is 90% of its initial value. This must be the same as cell I45 in the attached TM-28 report. This must be at least 36,000 hours.

Fixture Flux Within Far Red Band – Does your product emit at least 5% of its 400-800nm flux in the 700-800nm band? You will need to report the flux maintenance of this Far Red band. If "Yes", then continue to the next question. If "No", then you are finished with this section. Please save and continue to the next section.

LM-84 Report, Far Red – Attach the LM-84 report showing the flux maintenance of the product in the Far Red (700 – 800 nm) band.

TM-28 Report, Far Red – Attach the completed TM-28 report for the Far Red (700 – 800 nm) band.

Q90 Time, in Hours, Far Red – Enter the time, in hours, at which the Far Red flux is 90% of its initial value. This must be the same as cell I45 in the attached TM-28 report.

- **Section 6: Driver Lifetime**

This section collects information on the expected lifetime of the driver(s) used in the product. For each unique driver used, enter each driver in a new entry set by clicking “Save & Add another Driver Lifetime question set”.

Driver Spec Sheet – Attach the spec sheet for the driver. This spec sheet should include documentation of the driver’s expected lifetime, in hours, as it varies with Temperature Measurement Point (TMP) temperature.

Driver Manufacturer – Enter the name of the driver manufacturer.

Driver Model Number – Enter the model number of the driver.

Driver ISTMT Report – Attach the ISTMT report (PDF) for the driver. This must include a) an extrapolation of the TMP’s expected temperature when at the fixture’s maximum rated ambient temperature, or b) documentation that the measurement was collected from true ambient conditions corresponding to the fixture’s maximum rated ambient temperature.

Driver Operating Temperature, °C – Enter the operating temperature of the driver when the product is at its maximum power state, and the ambient temperature at the maximum described on the product’s spec sheet. Explicit testing of the product in this environment is not necessary if the ISTMT report follows established temperature projection methods used by approved safety organizations.

Driver Lifetime, Hours – Enter the expected lifetime of the driver in hours when operating at the product’s maximum power state, at the maximum ambient temperature on the product’s spec sheet. This must be at least 50,000 hours.

- **Section 7: Fan Lifetime**

This section collects information on the expected lifetime of any fan(s) used in the product. For each unique fan used, enter each fan in a new entry set by clicking “Save & Add another Fan Lifetime question set”.

Fan Presence – Does the product use an internally-mounted fan to provide cooling for its components? If “Yes”, then complete the rest of this section, and input a complete set of answers for each fan model that is used in your product. If “No”, then please continue to the next section.

Fan Spec Sheet – Attach the spec sheet for the fan. This spec sheet should include documentation of the fan’s expected lifetime, in hours, as it varies with ambient temperature.

Fan Manufacturer – Enter the name of the fan manufacturer.

Fan Model Number – Enter the model number of the fan.

Fan Lifetime at Maximum Ambient Fixture Temp, Hours – Enter the expected lifetime of the fan in hours when operating at the maximum ambient temperature on the product’s spec sheet. This must be at least 50,000 hours.

- **Section 8: Spectral Tuning**

This section collects flux statistics for any spectral control channels in the product. For each unique channel, enter the information in a new entry set by clicking “Save & Add Another Spectral Tuning question set”.

Spectral Tuning Presence – Does the product use spectral tuning beyond single-axis dimming? If “Yes”, then complete the rest of this section, and input a complete set of answers for each spectral tuning control channel that is used in your product. If “No”, then please save and continue.

Name of Spectral Control Channel – Enter the name of the spectral control channel in question. This will appear on the QPL.

Spectral Channel Test Report – Attach the test report (PDF) showing the flux output in the ranges described below. The product should be in a state that maximizes the output of the channel in question, while minimizing all other channels. Directional (PPID) and spectral (SQD) data are not required as part of this test report.

Isolated Channel Photon Flux, Blue, $\mu\text{mol/s}$ – Enter the product’s flux in the 400-500nm range when in this isolated channel state.

Isolated Channel Photon Flux, Green, $\mu\text{mol/s}$ – Enter the product’s flux in the 500-600nm range when in this isolated channel state.

Isolated Channel Photon Flux, Red, $\mu\text{mol/s}$ – Enter the product’s flux in the 600-700nm range when in this isolated channel state.

Isolated Channel Photon Flux, Far Red, $\mu\text{mol/s}$ – Enter the product’s flux in the 700-800nm range when in this isolated channel state.

Please contact horticulture@designlights.org if you have any questions about filling out or submitting the web application.