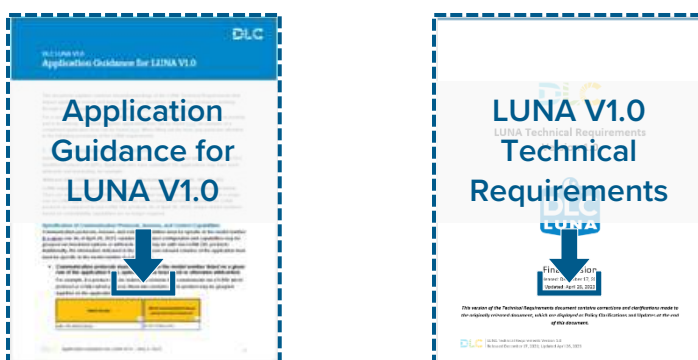


# Technical Requirements Guidance for Submitters

This companion to the LUNA Technical Requirements is a high-level summary that details:

- ✓ What is needed to create a complete LUNA application.
- ✓ Which product types are allowed or disallowed under LUNA.
- ✓ The required supporting documentation for a LUNA application.

Please refer to the [LUNA Technical Requirements](#) for the comprehensive set of requirements, and the [LUNA Application Guidance](#) for more information on filling out a complete application.



All LUNA products must meet all required SSL V5.1 testing, threshold, and reporting requirements. All LUNA testing requirements must be supplied on LUNA-qualifying products, even if there are non-LUNA products included in the application. See [page 6](#) for an example of the required testing for a hypothetical family with LUNA-eligible and non-LUNA-eligible products.

As of April 26, 2023, variations in product configuration due to controls capabilities may now be grouped via bracketed options or wildcards as they may be with non-LUNA SSL products. This companion document reflects these changes.

## SSL Primary Use Designations (PUDs) eligible for LUNA V1.0

The following Primary Use Designations (PUDs) are the *only* PUDs eligible to apply for LUNA qualification. All other PUDs are not eligible for LUNA.

- Outdoor Pole/Arm-Mounted Area and Roadway Luminaires
- Outdoor Pole/Arm-Mounted Decorative Luminaires
- Outdoor Full-Cutoff Wall-Mounted Area Luminaires
- Bollards
- Fuel Pump Canopy Luminaires
- Specific Specialty PUDs: Refer to the [LUNA Technical Requirements](#) for a complete list.

## Summary: Additional LUNA requirements for outdoor luminaires

Topic	LUNA V1.0 requirements in addition to or different from SSL V5.1 (summary)
<b>Efficacy Allowance</b>	<ul style="list-style-type: none"><li>• Efficacy allowances are available for shielded luminaires</li><li>• Efficacy allowance of 25% for bollards</li></ul>
<b>Light Distribution</b>	<ul style="list-style-type: none"><li>• Required maximum U Ratings, varies by PUD</li><li>• Shield option or accessory must be available for pole/arm-mounted luminaires</li><li>• Maximum allowable tilt of +/- 10 degrees for pole/arm-mounted luminaires</li><li>• Images of luminous intensity distribution submitted and published to QPL</li></ul>
<b>Spectral Quality</b>	<ul style="list-style-type: none"><li>• Spectral Power Distribution: Image and .spd file submitted and published to QPL</li><li>• Eligible CCT: 2200K – 3000K</li></ul>
<b>Controllability</b>	<ul style="list-style-type: none"><li>• Continuous dimming capability to <math>\leq 20\%</math> of max output power required</li><li>• More detailed reporting</li></ul>

### LUNA Light Distribution Requirements

#### U-Rating of 0, 1 or 2 required for certain PUDs.

LUNA products must have a U-Rating (from the BUG system described in ANSI/IES TM-15) of 0, 1 or 2, depending on the PUD indicated in [Table 5](#) of the LUNA Technical Requirements.

#### Luminous intensity distribution images required.

Luminous intensity distribution images must be submitted for the product with the highest total lumen output for each optical variation product for each unique distribution pattern included in the application. The images must be generated by the [LUNA Pre-submission Tool](#).

#### Shielding option or accessory required.

For pole/arm-mounted area/roadway/decorative PUDs, shielding must be available as an accessory or option; however, it does not need to be included in the model numbers seeking LUNA qualification.

- Specification sheets or supplemental documentation must include at least one shielding option or accessory, and the shield must have an ordering code.
- Shields may be external to the luminaire or internal to the glass or optic.

#### Maximum allowable tilt of +/- 10 degrees.

Maximum allowable tilt for pole/arm-mounted luminaires is +/- 10 degrees if a mount is included with the product.

- The model number must include the LUNA-conforming mounting option or accessory and will be published on QPL.

For example, “**ABC-100W-30K80CRI-HA**” where HA is the nomenclature/ordering code for a horizontal arm mounting option; or “**ABC-100W-30K80CRI (with accessory HA)**” where HA is the nomenclature/ordering code for a horizontal arm mounting accessory.

- The mounting bracket and related maximum tilt angle must be shown graphically on either the specification sheet or installation instructions.
- Products previously qualified under SSL V5.1 as having field-adjustable light distribution (FALD) can be qualified to LUNA if they meet the aiming requirement, but they will no longer be categorized as FALD once qualified under LUNA.

### Full LM-79/distribution report(s) required.

A full LM-79/distribution report in .pdf format must be provided for the products that have the highest total lumen output for each optical variation within a family at the highest LUNA-qualifying CCT (e.g., 3000K), tested at the maximum (non-dimmed) light output. An .ies file, and optionally, an [ANSI/IES TM-33-18 .xml document](#), both based on this LM-79 test data, must be submitted along with the .pdf distribution report.

- Product image(s) of the tested product that show the optics, worst-case performance-affecting mounting structures, and shields (if applicable) must be included in the .pdf distribution report.
- Product image(s) may be of the tested product on the bench, rather than in the measuring equipment.
- Worst-case performance-affecting mounting options available from the manufacturer that interact with the luminous intensity distribution of the product must be included with each optical variation (e.g., mounts that increase uplight the most or reflect light in any unintended direction).

For example, a pole/arm mounted decorative luminaire with a fixed yoke mount is expected to increase uplight the most, compared to a horizontal fixed arm mount. The tested optical variation could be “**ABC-100W-30K80CRI-Y**” where Y is the nomenclature/ordering code for a fixed (i.e., non-pivoting) yoke mounting option, or “**ABC-100W-30K80CRI (with accessory Y)**” where Y is the nomenclature/ordering code for a fixed (i.e., non-pivoting) yoke mounting accessory.

## LUNA Spectral Quality Requirements

### CCT between 2200K – 3000K required.

All products must exhibit chromaticity consistent with at least one of the basic, flexible, or extended, nominal 7-step quadrangle CCTs from 2200K - 3000K.

### Color-tunable product range limited to 2000K – 3000K.

White-tunable and warm-dimming products are eligible for LUNA so long as they are not tunable to CCTs outside the LUNA chromaticity requirements (i.e., the product’s tunable range must be limited to between 2200-3000K).

## ANSI/IES TM-27-20 .spx files required for all products tested to meet LUNA spectral quality requirements.

Products tested to meet LUNA spectral quality requirements must submit an ANSI/IES TM-27-20 .spx file containing spectral power distribution data in increments of  $\leq 5\text{nm}$ . They may optionally submit [ANSI/IES TM-33-18 .xml documents](#) as well.

## Full LM-79/color reports required for specific models.

A full LM-79/color report (per the [Additional Reporting Guidelines](#)), must be provided for the lowest and highest LUNA-eligible CCT options offered, at the minimum color rendition option.

- An .spx document and an image of the spectral power distribution data must also be submitted for each LM-79/color report. Images must be generated by the [LUNA Pre-Submission Tool](#). The .spx document and image will be published on the QPL.

## LUNA Controllability Requirements

### Continuous dimming to <20% of max output power required.

Continuous dimming capability to <20% of max output power is required. Product specification sheet or supplemental materials must clearly identify continuous dimming capability as well as the minimum dimming level as a percentage of maximum output current or power.

### Communication protocols and integral control capabilities must be identified.

As of April 26, 2023, the LUNA V1.0 Technical Requirements allow controls capabilities to be wildcarded or bracketed together within a single model number as long as they comply with the requirement of continuous dimming to at least 20% of maximum output power.

*For example, if one version of the product uses the 0-10V wired communication protocol, and another version (in which the only difference is the communication protocol) uses D4i, the listed model can include both 0-10V and D4i, and the following grouping options are both valid:*

- *The communication protocols can be wildcarded together, e.g., [ALL CONTROL OPTIONS]*
- *The communication protocols can be bracketed together, e.g., [0-10V, D4i]*

Note that this may require the separation of models that were otherwise able to be combined on the SSL QPL. For example, a roadway/area luminaire with integral bilevel control capable of dimming down to 50% of full maximum power could be wildcarded under an SSL V5.1 Standard listing, but is not eligible for LUNA V1.0 because the luminaire must be dimmable to at least 20% of full maximum power.

Multiple communication protocols or integral control capabilities may be wildcarded or bracketed in a single model number even if product changes are necessary to achieve the dimming functionality. If a single model submitted for LUNA qualification can accept multiple communication protocols or integral control capabilities, then all protocols or integral control capabilities must be identified.

For example, consider the four Wired Analog communication protocols shown in [Table 8](#) of the LUNA requirements. If your model only accepts 0-10V, select only the relevant options that can be accepted by that model (i.e., only select the relevant options among these four: 0-10V IEC 60929 Annex E; 0-10V ANSI C137.1-2019 (8-Volt); 0-10V ANSI C137.1-2019 (9-Volt)).

Communication protocols and integral control capabilities available per model number must be selected in the Excel application form. Only those protocols that are available on the specific models should be selected.

- Specification sheets or supplemental documentation must include the specific terminology provided in [Table 8](#) and [Table 9](#) of the LUNA Technical Requirements for the protocols and integral control options included on the application form.
- If a product utilizes a protocol that is not listed in the Excel application form, type the protocol in the “Other Protocol” column. Do not fill out this column if the product utilizes a protocol that is already an option/column on the Excel application form.

## Example Required Testing Scenario

An example of a hypothetical area lighting family with LUNA-eligible and non-LUNA-eligible products is shown in the table below (corresponds to [Table 3](#) in the LUNA Technical Requirements. The products that must be LM-79 tested for V5.1 and for LUNA V1.0 are identified.

**Table 3 from LUNA Technical Requirements:** Hypothetical V5.1 Family with LUNA- and Non-LUNA-Eligible Products

Model Number	LUNA Eligible?	Optic	CCT (K)	Lumen Output	Efficacy (LPW)	Test Type Required	Test Purpose
ABC_L 75W T1 2500K	Yes	Type 1	2500	9310	120.9	LM-79/color	V5.1: lowest light output
ABC_L 150W T1 2500K	Yes	Type 1	2500	18160	119.5	LM-79/color	V5.1: lowest CCT, lowest efficacy
ABC_L 75W T1 3000K	Yes	Type 1	3000	9410	122.2		
ABC_L 150W T1 3000K	Yes	Type 1	3000	18350	121.5	LM-79/color LM-79/distribution including LUNA requirements	V5.1: distribution LUNA: distribution at highest light output at highest CCT
ABC_L 75W T1 4000K	No	Type 1	4000	9600	128		
ABC_L 150W T1 4000K	No	Type 1	4000	18720	126.5		

Model Number	LUNA Eligible?	Optic	CCT (K)	Lumen Output	Efficacy (LPW)	Test Type Required	Test Purpose
ABC_L 75W T1 5000K	No	Type 1	5000	10080	142		
ABC_L 150W T1 5000K	No	Type 1	5000	19660	139.4		
ABC_L 75W T2 2500K	Yes	Type 2	2500	9510	123.5		
ABC_L 150W T2 2500K	Yes	Type 2	2500	18540	122		
ABC_L 75W T2 3000K	Yes	Type 2	3000	9600	124.7		
ABC_L 150W T2 3000K	Yes	Type 2	3000	18730	124	LM-79/distribution including LUNA requirements	V5.1: distribution LUNA: distribution at highest light output at highest CCT
ABC_L 75W T2 4000K	No	Type 2	4000	9800	130.7		
ABC_L 150W T2 4000K	No	Type 2	4000	19110	129.1		
ABC_L 75W T2 5000K	No	Type 2	5000	10290	144.9		
ABC_L 150W T2 5000K	No	Type 2	5000	20070	142.3		
ABC_L 75W T3 2500K	Yes	Type 3	2500	9700	126		
ABC_L 150W T3 2500K	Yes	Type 3	2500	18920	124.5		LUNA: Lowest CCT at highest light output
ABC_L 75W T3 3000K	Yes	Type 3	3000	9800	127.3		
ABC_L 150W T3 3000K	Yes	Type 3	3000	19110	126.6	LM-79/distribution including LUNA requirements	V5.1: distribution LUNA: highest CCT at highest light output, distribution at highest light output at highest CCT

Model Number	LUNA Eligible?	Optic	CCT (K)	Lumen Output	Efficacy (LPW)	Test Type Required	Test Purpose
ABC_L 75W T3 4000K	No	Type 3	4000	10000	133.3		
ABC_L 150W T3 4000K	No	Type 3	4000	19500	131.8		
ABC_L 75W T3 5000K	No	Type 3	5000	10500	147.9		
ABC_L 150W T3 5000K	No	Type 3	5000	20480	145.2	Full LM-79/color	V5.1: highest CCT