

Lighting Africa Minimum Standards and Performance Targets

Version 2.1 October 2011

Lighting Africa maintains two parallel sets of off-grid lighting benchmarks: The Minimum Standards and Performance Targets. The Standards set a baseline level of quality, durability, and truth-in-advertising to protect consumers and the Targets are Lighting Africa's recommended level of performance above the Standards. The Standards and Targets are summarized below and listed in detail on the following page.

Conformance with the Lighting Africa Standards and Targets is evaluated based on results from laboratory testing according to the Lighting Africa Quality Test Method (LA-QTM). The tests are conducted at a third-party, approved test center using randomly procured samples. Information contained in Lighting Africa Standardized Specifications Sheets (SSS) is acceptable for determining conformity with the Standards and Targets; any product with an up-to-date SSS is required to have passed the Standards.

Summary of Standards and Targets



Minimum Standards for Quality, Durability, and Truth-in-advertising



- 1) **Truth in Advertising:** Accurate consumer-facing labeling (e.g., rated run time, battery capacity, PV power).
- 2) **Lumen Maintenance:** L70 time is > 2000 hours.
- 3) **Quality:** Pass basic durability and quality checks.



Performance Targets recommended by Lighting Africa

Meets all the Minimum Standards, plus the following:

- 1) **Brightness:** 20 lumens or illuminates an area equal to 2 sheets of paper @ 25 lux
- 2) **Run Time:** 8 hour autonomous run time or 4 hour PV run time
- 3) **Quality:** Pass extended durability checks

Category	Sheet Field	 Minimum Standards	 Performance Targets <i>(beyond the Standards)</i>	
Information	Manufacturer	Accurately Specified		
	Product Name & Model #	Accurately Specified		
	Warranty	Accurately Specified, Minimum coverage 6 months on manuf. defects under normal use, including battery.		
Illumination	Light output	Accurately specified at each available level (lumens).	At least one level, which defines the “specified light output” in subsequent testing, must meet one of the following criteria: <ul style="list-style-type: none"> • ≥ 20 lumens • Illuminates a 0.1 m^2 surface at ≥ 25 lux under conditions defined by LA-QTM 	
	Lamp Type	Accurately Specified		
Energy System Performance	Run Times	Accurately specified for each light setting.	Autonomous Run Time (full battery): ≥ 8 hours @ \geq specified light output AND/OR Lighting hours per solar day (PV only): ≥ 4 hours @ \geq specified light output	
Lumen Maintenance	Lumen Maintenance at 2000 Hours	$\geq 70\%$ of specified light output at 2000 hours (depreciated at highest setting)		
Charger	Charger Rating	Charger Power Rating Accurately Specified (e.g. PV power or mechanical charge time)		
Storage	Battery Capacity	Accurately Specified		
Quality and Durability	Physical Ingress Protection ⁱ (by lamp type ⁱⁱ)	Fixed Indoor	IP 2x	
		Portable Separate	IP 4x	
		Portable Integrated	IP 4x	
		Fixed Outdoor	IP 6x	
	Physical Ingress Protection for electrical connector elements only		IP 2x	
	Water Protection ⁱⁱⁱ	Fixed Indoor	IP x0 (none)	IP x1 OR equivalent OR with warning label
		Portable Separate	IP x1 OR equivalent OR with warning label	
		Portable Integrated	IP x3 OR equivalent	
		Fixed Outdoor	IP x7 OR equivalent	
	Drop Test	Fixed Indoor	No requirement	
Others		5 out of 6 samples are functional after drop test (1m onto concrete); none result in dangerous failures ^{iv}		
Soldering and Electronics Quality		Pass Soldering and Electronics Inspection (without endemic bad joints, pinched wires, etc.)		
Switch and Connector Durability		5 out of 6 samples are functional after 1000 cycles; none result in dangerous failures ^{iv}		

ⁱ Physical Ingress Protection minimum requirements cover all non-connector elements of the product. Electrical connectors (e.g., PV module sockets) are subject to the alternative requirements listed in the table (i.e. IP 2x).

ⁱⁱ The lamp type is based on the following categories, with category assignment defaulting to the most stringent (highest IP class) unless a less stringent category description is met:

“Fixed Indoor” are non-portable, with a central station and separate light points (battery, energy source, and light sources must be disaggregated); the product can include an external PV module with a cable of ≥ 3 meters.

“Portable Separate” have an integrated battery and light source in a single package with an external PV module or non-PV charging system. If an external PV module is used, the cable length must be ≥ 3 meters.

“Portable Integrated” are like portable separate, but with an integrated PV module or a PV cable length ≤ 3 meters. There is no mounting hardware for permanent outdoor use and the product is sufficiently portable to be carried conveniently.

“Fixed Outdoor” are products designed for permanent fixture outdoors, with an integrated PV module, light, and battery. They have mounting hardware included (e.g. LED streetlighting systems).

ⁱⁱⁱ There are two alternative Water Protection compliance pathways allowed by Lighting Africa (i.e. these are alternatives to meeting the IP class requirements). In one alternative (“equivalent”), the whole system of protection (ingress protection + electronic circuit protection + manufacturing QC) is evaluated to determine if the protection level is equivalent to that of a product with the required level of ingress protection. In another alternative (“warning label”) there are clear messages to the consumer about avoiding exposure to water on the packaging. The warning level messages must meet Lighting Africa program guidelines. The pathways and associated guidelines are described in greater detail in “Lighting Africa Minimum Standards and Performance Targets Note: Physical Ingress and Water Protection Requirements.”

^{iv} Dangerous failures are defined as those which may expose the user to physical harm, such as harmful chemicals, heat (e.g., from an electrical short or fire), or sharp materials (e.g., broken glass).