

Briefing Notes

Issue 5 – May 2011

Practitioners' Guides to Off-grid Lighting
<http://www.lightingafrica.org/resources/briefing-notes>

Interpreting Standardized Specification Sheets

This Technical Brief discusses the standardized specification sheet developed by Lighting Africa for uniform performance and quality reporting. Highlighting the key portions of the format, this annotated guide is meant to assist the buyers of off-grid lighting products who are using the specifications sheets as a reference for evaluating products.



In order to assist the buyers of off-grid lighting products, Lighting Africa has developed a standardized specification sheet (SSS) that manufacturers are encouraged to utilize when

describing their products' performance. The format has been developed to present all of the most important information about the system's performance (including lighting service, charging capability, and battery life) in a simple, standardized layout.

There are two mechanisms to ensure the accuracy of information on specification sheets. First, rather than being comprised of information that is solely manufacturer self-reported, the information on the specification sheets is mainly based on testing results from independent testing laboratories. The performance and quality measurements are made using Lighting Africa's Quality Test Method with random samples. Second, the specification sheets also include a link to the original version on a Lighting Africa maintained website, enabling buyers to confirm that information in a specification sheet is verified by Lighting Africa.

Every product in the SSS program has met Lighting Africa's basic minimum standards¹ for truth in advertising and quality. The quality standards include:

IP class²: ≥ 20 for fixed indoor products (can include external solar modules), ≥ 41 for portable products with external solar modules, ≥ 43 for products with integrated solar modules

Lumen maintenance: ≥ 2000 hours (lumen output maintained above 70% of initial level).

General: Passes basic mechanical durability and workmanship screening.

Standardized specification sheets are NOT an endorsement (or criticism) by Lighting Africa of product performance. They are simply a statement of fact based on actual testing results. People interested in a product should always review the information in the SSS to determine if its performance and quality meet their needs. For reference, the performance targets that Lighting Africa uses for including products in consumer awareness campaigns are shown below; they are in addition to the minimum standards listed above.

















Run Time: ≥ 8 hours autonomous runtime or ≥ 4 hours solar runtime

Lighting Service: Total luminous flux ≥ 20 lumens OR "useable" working surface (surface with ≥ 25 lux) must be $\geq 0.1\text{m}^2$ based on LAQT light distribution testing

The next page of this document shows an example specification sheet along with explanations of the various sections and metrics, which are included.

¹ The details on the Minimum Standards can be found at: <http://www.lightingafrica.org/resources/technical-research.html>

² IP Class is the Ingress Protection Classification, read more at http://en.wikipedia.org/wiki/IP_Code

Example Product													
1	<div style="text-align: right; font-size: small; margin-bottom: 5px;">Verify specifications at: www.lightingafrica.org/specs/EX_01</div> <div style="background-color: #cccccc; padding: 2px;">Overall Performance</div> <p style="margin-top: 5px;">“High” setting: 25 lumens for 4 hours after one day of solar charging</p> 												
2	<div style="background-color: #cccccc; padding: 2px;">General Information</div> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td>Manufacturer</td><td>Example Corporation, Inc.</td></tr> <tr><td>Product Name</td><td>Example Lamp 3000+</td></tr> <tr><td>Model Number</td><td>ABC12345</td></tr> <tr><td>Contact</td><td>janedoe@examplecorp.com</td></tr> <tr><td>Website</td><td>www.examplecorp.com</td></tr> <tr><td>Warranty</td><td>6 months for lamp, 1 year for solar module; see detailed terms for more information.</td></tr> </table>	Manufacturer	Example Corporation, Inc.	Product Name	Example Lamp 3000+	Model Number	ABC12345	Contact	janedoe@examplecorp.com	Website	www.examplecorp.com	Warranty	6 months for lamp, 1 year for solar module; see detailed terms for more information.
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14	<div style="background-color: #cccccc; padding: 2px;">Additional Information & Special Features</div> <p style="margin-top: 5px; font-size: x-small;"> Lamp Housing: Injection molded ABS Standard feature: Mobile phone charging with six connectors Factory Certification: ISO9001 </p>												
15	<div style="background-color: #cccccc; padding: 2px;">Date of Sample Procurement for Testing</div> <p style="text-align: right; margin-top: 5px; font-size: x-small;">January 2011</p> <p style="text-align: right; font-size: x-small; margin-top: 5px;">Revision 2011.01</p>												

Number	Description
1	This section provides a brief summary of the product's light output (lumens) and run time (hours), two key performance indicators for end-users. More detail on both of these is provided below.
2	This section provides general information on the manufacturer and the product.
3	The autonomous run time is the length of time that the product can be expected to operate at the specified light level after the battery is fully charged.
4	The lighting hours per solar day is the length of time that a product can be expected to run at the specified light level after being charged by its PV module for a full, sunny day.
5	This section provides information on several important lighting characteristics. For more detailed descriptions of the lighting metrics discussed here, please refer to Lighting Africa's "LED Lighting Basics" technical note: http://www.lightingafrica.org/resources/briefing-notes
6	The type of lamp, listed here, largely determines the efficiency and characteristics of the light put out by a product. LED stands for "light emitting diode;" CFL stands for "compact fluorescent lamp."
7	The product's light output is provided here in lumens. Lumens are a measure of the amount of light generated by a light source. This is not to be confused with lux or foot-candles, which are measurements of how bright the light is on a surface a particular distance and direction away from the lamp (again, readers are encouraged to review the "LED Lighting Basics" technical note for more information in these metrics). For reference, the light output of typical hurricane-style kerosene lamps is 10-40 lumens, candles and wick lamps generally produce 10 lumens or less, and a 60 watt grid-connected light bulb produces about 900 lumens.
8	Light output is also reported after 2000 hours of operation. This is an important measurement because all light sources degrade over time and while many products have been shown to have light outputs that degrade slowly, some are greatly reduced after they have been in use for only a short while. Lighting Africa requires that products are still capable of producing at least 70% of their original light output reading after 2000 hours of operation in order to pass the lumen maintenance quality metric.
9	Products are characterized as having a "narrow," "wide," or "omni" (i.e. light going in all directions) distribution in this section. Additionally, two light quality measurements, the color appearance and the color rendering of the lamps, are provided here. The lamp's color appearance measurements (how "warm" or "cool" the light appears) are not inherently good or bad – some people prefer a "cooler" (more blue) light while others prefer a "warmer" (more red) light. Color rendition, on the other hand, is directly related to the quality of light, where higher numbers correspond to better light quality. It is measured on a color rendering index (CRI) scale that ranges from 0 (does not render colors at all) to 100 (renders colors completely accurately). The color of daylight is shown on the color appearance scale for reference. The CRI of daylight is close to 100.
10	This section describes the type of charging system utilized by the product (e.g. PV, grid, mechanical)
11	This section describes the product's storage (e.g. battery) system.
12	It is useful for end users or distributors interested in battery replacement to know the technical details of batteries. This section shows the battery type, nominal operating voltage and overall battery capacity.
13	Batteries can become damaged and/or age prematurely if they are allowed to either overcharge or completely discharge. This item indicates if the product has a high voltage disconnect (HVD) that prevents battery overcharging and a low voltage disconnect (LVD) that protects against excessive discharge. Also indicated is whether this protection is "active" (i.e. a micro-controller which turns the system off when over or under charge conditions are present) or "passive" (i.e. the system is designed such that it is simply not possible to overcharge or over discharge it).
14	This section provides additional information that was not covered in the previous section as well as other special features that the manufacturer wishes to highlight about the product.
15	Each report includes the date of procurement of the tested product; because manufacturers often update their products, this section indicates how up-to-date the information is.
16	In an effort to prevent counterfeiting, Lighting Africa is maintaining a website that contains up-to-date specification sheets for products that have been tested in accordance with Lighting Africa's test standards. Go to the website indicated to verify that the specification sheet is in fact authentic. This is a static, unique web address so that one can check the contents of the sheet with the source.