LIGHTING GLOBAL
Catalyzing Markets for Modern Lighting

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Lighting Global Quality Assurance Update 2012:

Final Action Decisions

28 March 2012

Lighting Africa's Quality Assurance (QA) framework for off-grid lighting products is going global in 2012—Lighting Global will be the new home for the framework. The need for affordable, good quality lighting off the grid extends beyond Africa and there is an opportunity to work towards a globally harmonized QA framework that rigorously protects consumers with a simple, stable framework.

Over the last three months we have completed a stakeholder feedback process to help inform the next version of the QA framework as we transition to Lighting Global. We received very good input from stakeholders across the global supply chain for off-grid lighting. Those recommendations and comments on the program are helping to guide a process of institutionalizing aspects of the QA framework with the International Electrotechnical Commission (IEC); the process is likely to be completed this year.

This document is a summary of the changes that were suggested and includes notes on whether each change will be implemented.

What are the implications of a transition to Lighting Global?

Lighting Global does not replace Lighting Africa but expands it. Lighting Africa will continue to support African consumers and institutions with market intelligence, consumer education, access to finance, business development services, and policy outreach that is responsive to local needs. Lighting Africa will also continue to maintain minimum quality standards and recommended performance targets for program qualification. Lighting Global will provide the QA testing and communication services that are integral to Lighting Africa's work.

Who provided comments on the QA Framework?

- A number of manufacturers and distributors of off-grid lighting products
- Solar Energy Centre (India)
- The Energy and Resources Institute (TERI, India)
- The Bureau of Indian Standards (BIS)
- Kenya Bureau of Standards
- Fraunhofer Institute for Solar Energy Systems (Germany)
- The German Agency for International Cooperation (GIZ)
- Navigant Consulting

We have gotten feedback from around the globe:

- Africa: Kenya, South Africa, Tanzania, Senegal, Ethiopia
- Asia: India, China, the Philippines, New Zealand
- Other: USA, New Zealand, France, Germany, UK, the Netherlands

Why does the QA framework matter?

The Lighting Global QA framework will **meet the needs of a growing market** by:

- Seeking an appropriate balance between product quality and affordability
- Using rigorous tests that can be carried out using reasonably low cost instruments
- Maintaining stable and transparent QA policies so stakeholders know what to expect
  Effectively communicating product performance information so buyers can make informed purchasing decisions

In addition to its use for qualification in Lighting Africa programs, the QA framework is **partially or fully "harmonized" with a growing number of other institutions**, including the United Nations Framework Convention on Climate Change

Lighting Africa's QA program **trajectory is towards global harmonization**; our goal is that off-grid lighting products can be tested once to qualify for the numerous market support and regulation frameworks that exist, reducing transactions costs and simplifying the work of manufacturers who produce good quality products that meet the needs of consumers.

There is an opportunity in 2012 to institutionalize the test methods and metrics developed through the Lighting Global QA framework with the International Electrotechnical Commission (IEC). An IEC QA framework for off-grid lighting would facilitate greater harmonization for institutions and organizations across the globe.

When is the new QA framework active?

The new framework is active now (as of 28 March 2012). Companies with products that are impacted by changes to the Standards and Targets will be contacted by the Lighting Global QA team. If you are not contacted and think your product is impacted, please contact us at qualityassurance@lightingafrica.org.

What are the key updates to the QA framework?

The key updates are highlighted here. The full set is detailed in the table below. Not all of the policy documents to support the updates are complete. As the updated policy documents are completed they will be added to the website.

1. Reducing the time to receive test results for most products by obtaining preliminary lumen maintenance results in half the time (i.e., 1000 hours);
2. Improving the solar run time calculation accuracy;
3. Adding gooseneck and strain relief tests to better capture mechanical durability;
4. A new, integrated framework for assessing water protection: considering the overall water exposure protection afforded by the enclosure, other technical approaches like conformal coatings, and consumer labels and instructions.
5. Reducing the water exposure and physical ingress protection requirements for "fixed indoor" products by one level;
6. Adding a formal self-certification section, mechanical durability results, and a graphical results summary to the Standardized Specification Sheets (SSS);
7. Requiring batteries to be protected by a charge controller; and
8. Adding various observations to the visual screening test.

Full set of recommendations:

The table below summarizes the recommended updates to the QA framework. In the interest of confidentiality and clarity, we summarized and synthesized the recommendations we received. The information in the table includes:

- The "**category**" of the recommendation—what part of the framework it will affect.
- A summary of the **recommendation**
- A decision on **adoption** (Yes, No, or somewhere in between for some).
- An **assessment** of the recommendation that informs why it is possible or difficult.
- A **draft change** for those that are likely or neutral to help explain the implications of adopting a particular recommendation

If you have any feedback on the process, please provide comments to qualityassurance@lightingafrica.org

Category	Recommendation	Decision	Lighting Africa Assessment	Draft Change (if applicable)
General Scope and Cost	Reduce testing duration and cost by a modest amount.	Yes	Our analysis of testing data suggests that the sample size for Lighting Africa testing is appropriate, which does not suggest an opportunity for cost reductions without threatening the validity of the test results. However, in many cases, the duration of the lumen maintenance test may be reduced (the limiting factor for testing in the current scheme). We expect it will be possible in 75% of the cases to reduce the time it takes to get official test results by about 40%. There are more details in other recommendations.	See details in other suggestions.
General Scope and Cost	Lighting Africa should clearly communicate what triggers retesting and what does not.	Yes	This is good feedback. We will work to present Lighting Africa policies more clearly on the website.	Look for new web content after the stakeholder process.

General Scope and Cost	In general, do not tighten any standards or targets in this round of changes.	Yes and No	Maintaining a stable set of standards and targets is a key goal of the QA program. We agree with this suggestion in principle but with a caveat—there are certain areas where consumers are not being adequately protected currently related to battery durability that we intend to address. In cases where changes to the program would result in products that currently pass falling short of the new standards, we would continue to support those products for the duration of their test results validity (i.e., two years after the end of testing).	n/a
General Scope and Cost	Allow testing of prototype (pre-production) samples to facilitate approval of new models before they launch.	Yes and No	We agree this is a good goal in principle but need to consider logistics. One possibility, which is not likely in the short term but could be in the medium term (6 month-1 year): Allow testing of manufacturer-provided prototypes for provisional certification with immediate, automatic market check-testing of production run samples. If the check test results do not match those from the prototypes, a strong response from Lighting Africa would be warranted. The additional cost of this testing scheme would be borne by the manufacturer.	We will continue to consider this recommendation.

General Scope and Cost	Drastically reduce the scope, duration, and cost of testing (i.e., tests should last 30 days, be targeted for completion by unskilled workers, and cost less than $1,000)	No	The Lighting Africa Quality Test Method is the go-to standard for off-grid lighting because buyers and consumers are protected by its rigor. All along, we have struck a balance between technical rigor and affordability—realizing that the makers of off-grid lights are often price-sensitive like those who use them. We already have a shorter, less expensive version of testing—the Initial Screening Method—but it is not thorough enough to maintain the quality of test results that the market has come to expect from Lighting Africa.	n/a
General Scope and Cost	Allow self-certification using results generated at in-house test labs.	No	This is not possible...for now. We agree it is a good aim in the long-term but are not in a position to design and implement the strong verification regime for manufacturer test lab results that would be required for self-certification to work. As the market matures and our QA framework is institutionalized, we think self-certification will emerge as an option.	n/a
Improved Methods	Improve the accuracy of "run time per day of solar charging" estimates.	Yes	Our analysis has shown that the addition of easy-to-make circuit efficiency measurements can improve the accuracy of "solar run time" estimates. The original estimates assume typical efficiencies but our lab research has shown those can be off by 50% or more.	Add measurements of electronic circuit efficiency to the test method and use them, in combination with other results, to estimate of solar run time.

Improved Methods	Reduce the duration of the lumen maintenance test.	Yes	Our analysis shows that we can achieve nearly the same level protection from poor-performing products (98% agreement with current-day method) using a flexible "end-of-test" criterion. If the suggested changes had been in place before, 80% of products would have their result (good or bad) after 1,000 hours.	Allow the test results to be reported at 1,000 hours if certain criteria are met that ensure the samples are likely to pass the threshold—maintaining at least L70 at 2,000 hours. The general "pass" criteria at 1,000 hours are L95 average performance and a flat trend. More details are available in the supporting document titled "Lumen Degradation Testing." The test would still continue to 2,000 hours (with an addendum issued at that time) to ensure coverage for CDM project qualification.
New Test Methods	Add a gooseneck durability test.	Yes	Multiple field trials have shown that goosenecks are a potential point of early failure, like switches and connectors. It makes sense to protect consumers from these failures.	Add a gooseneck test that is similar to the existing tests of switches and connectors. Bend the gooseneck through its full range of motion 1,000 times. Ensure the product is functional and the user is not exposed to any safety hazard.

New Test Methods	For products with mobile phone charging features, add estimates for the reduction in available lighting service from recharging phones.	Yes	The rapid influx of mobile phone charging features in off-grid lighting products (off grid "microenergy" products?) demands a response in terms of providing good information on the trade-offs between lighting and other energy services. Our team is working on new, low cost tests to provide this information.	Once they are ready we will add the required tests to the ISM and QTM (mainly circuit efficiency measurements) and add to SSS.
New Test Methods	Measure the standby load of the charge controller and report it in the test results.	Yes	This is an easy measurement to make and in some cases may provide critical insight into underperforming products.	Measure the standby load of the charge controller as part of ISM and QTM testing.
New Test Methods	Test strength of strain relief on PV junction boxes.	Yes	This is a common-sense, easy-to-measure indicator of durability.	There will be a new part of QTM testing: hang a 2 kg weight from the PV module; it should not pull the cable loose or break the connection. The 2 kg force requirement is 25% of the requirement for "typical" on-grid PV modules. The same requirement will be placed for other cable-enclosure interfaces (e.g., hanging light points).

New Test Methods	Add a test of battery durability and, in some cases, a minimum standard for durability.	No	Experience from the field tells us that batteries are often the first component to fail in good quality systems. We have tests to ensure the durability of the LED's (lumen maintenance), casing (drop test), and electronic components in general (water exposure protection). A basic test of battery cycle durability makes sense, but right now there is not a clear way of doing this at low cost. Improvements to standards for charge controllers, combined with optional battery self-certification, is a likely near-term solution.	n/a
New Test Methods	Add measurements of efficiency and durability for AC-DC chargers that are included with products.	No	While these measurements may be helpful, in practice most products with AC-DC charging options are designed to interface with widely available mobile phone chargers. Lighting Africa already makes measurements of product performance after a charging cycle with any charger that is included, so basic functionality is assured. To reduce the likelihood of early AC-DC charger failure, Lighting Africa may require the charger to carry approval from a consumer electronics safety regulator.	Any AC-DC charger should carry approval from a consumer electronics safety regulator.
New Test Methods	Check for radio frequency interference.	No	While it would be helpful to know if products interfere with radio broadcasts, it is not clear what we would "do" with that information aside from report it. Standardization of the testing for this may be difficult.	n/a
New Test Methods	Add a long-term "actual use" test for overall durability.	No	It would be difficult to standardize and control this at a reasonable cost.	n/a

Other	Create and maintain a testing status website so companies can monitor the progress of their product (and up-to-date partial results) in "real" time.	No	Good idea, but the cost of building an interactive website to do this and the staff time to maintain it are outside the scope of our priorities right now. We would prefer to keep the cost of testing lower.	n/a
Relax Lighting Africa Standards or Targets	Reduce the water exposure protection Performance Target for "fixed indoor" products from IP x1 ("light rain") to IP x0 ("no protection")	Yes	This is an area where the program requirements should be relaxed. IP x0 is in line with consumer expectations for indoor appliances (e.g., TV's and radios). Also, it would bring the fixed indoor category requirements in line with other categories (i.e., with no differentiation between Minimum Standards and Performance Targets in terms of water protection).	The new Performance Target for fixed indoor products with respect to water protection is IP x0.
Relax Lighting Africa Standards or Targets	Reduce the physical ingress Quality Standard for all portable products from IP 4x ("paperclips") to IP 2x ("fingers").	Yes	This is an area where the program requirements should be relaxed. While it is desirable to protect products from dust with tight-fitting enclosures, there is no field evidence to suggest that physical ingress is causing early failure. Also, this change would allow us to deal with the issue of external connectors more objectively.	The new Quality Standard for all products with respect to physical ingress protection is IP 2x.

Relax Lighting Africa Standards or Targets	Allow accurate and appropriate consumer information (on the outside of the package or in the user's manual) to drop the required level of water protection by one level.	Yes	For products that are sensitive to water, one alternative for protection is obviously for the end-user to actively prevent exposure to liquids; for this to work they need to be informed that the product is indeed susceptible to damage if it is exposed. In the spirit of allowing a range of approaches to achieving the goal of Lighting Africa Standards, this addition makes sense. In this case the goal is to avoid both immediate (short circuiting) and medium-term (corrosion) failures from the exposure to water that is expected under normal use. Adding this option would mean there are essentially three strategies that can be used independently or in combination to meet the water protection standards: 1) water-resistant enclosures; 2) adding drainage and protecting internal circuits from the expected water intrusion; 3) giving consumers the information they need to adequately protect the product from exposure.	There is a new addendum document to the Standards and Targets titled "Water Protection Compliance Options" that details the paths to compliance.
Relax Lighting Africa Standards or Targets	Only require short-term water exposure protection in the testing and standards (i.e., make sure it still works when exposed to the expected environmental conditions); do not consider the potential for long-term corrosion.	No	Corrosion has been noted as a common source of early failure among products that are not well protected. This is an area where we want to ensure that consumers are protected from early failure, and is an aspect of product design that is very difficult for buyers to gauge independently.	n/a

Relax Lighting Africa Standards or Targets	Only require a one-meter cable to qualify as a product with a separate solar module (which influences the level of water protection that is required).	No	The goal of our cable length requirement (three meters or more is required) is to ensure it is possible to conveniently place products indoors while the solar module is outside, in the bright sun. While there are situations where a one meter cable might work, longer cables make it easier for the end-user to place the PV module in an optimal location while protecting the lamp from exposure to rain. Situations where there is shading near a door/window, a roof overhang to "get around," or other obstructions are common enough to warrant this cable length. We have also received recommendations to lengthen the requirement to five meters, and feel that would be too far in the other direction.	n/a

Relax Lighting Africa Standards or Targets	Do not require that warranty service reaches the consumer, only the distributor or importer.	Yes and No	We have gone out of our way not to prescribe how to service or design warranties; the only Minimum Quality Standards requirement is that consumers are offered at least six months of warranty protection. In practice, this means they should know that a warranty is available and if a buyer approaches an agent of the manufacturer, the warranty should be honored. We recognize the enormous practical difficulties in servicing warranties across the messy supply chains that are common for off-grid lights and have purposely not required any particular framework. If a particular in-country distributor is not good at servicing warranties, we also recognize that this is not an issue that should negatively impact manufacturers with respect to their status with the Lighting Africa program. As long as the end-buyers know that the product is backed by a warranty, it is up to distributors to close the loop (or gain a reputation for not doing so). We want to work with manufacturers and distributors to improve the quality of warranties for off-grid lighting products so we can strengthen consumer confidence together—building a stronger market.	n/a
Specs Sheet Change	Make a more formal self-certification section and allow listing of other product certifications (CE, UL, etc.) on the SSS.	Yes	This makes sense and is in the spirit of providing a clear platform for information sharing about product quality and performance. We have left the contents of the "optional information" section on the SSS up to the manufacturers and are always open to suggestions. The only requirement (as with the rest of the SSS) is that all information must be verified by Lighting Africa. We would ask to see certificates for CE or UL certification to include them on the SSS.	Add the following to self-certification options: [existing: ISO 900x], UL, CE, uV resistant plastic, uV-free LEDs, high temperature batteries (particularly for Ni chemistries), battery durability certifications.

Specs Sheet Change	Add graphical results summary to SSS banner.	Yes	A graphical representation of the key parameters would add value to the SSS for explaining the performance and quality aspects of products.	Add bar graphs / relative size icons for full battery run time, solar run time, and brightness. Include benchmarks in the brightness bar for hurricane kerosene lamps (20 lumens). Add icons that indicate number of luminaires, mobile charging capabilities, and durability criteria (drop test, water protection).
Specs Sheet Change	Add "mobile charging impacts" section to SSS that shows the change in lighting service from charging a mobile phone.	Yes	We intend to add mobile charging impact tests to the test method, and would also like to communicate this important information to the market.	Once a test is in place we will use the results to craft appropriate messages for the SSS.
Specs Sheet Change	Add information about durability test results.	Yes	These were initially left off the sheets because the baseline requirements to use the SSS (meeting Minimum Quality Standards) meant that every product met the same requirements, making the repetition of durability tests "passed' redundant. However, it is clear that not every user of SSS knows what those baseline criteria include. This is a good change and would add valuable information to the sheets. It would enable communication that every product using an SSS meets important durability requirements.	Add both graphic (icons) and textual indication of the durability tests passed by the product: Drop Test, Workmanship, Water Protection Level, and Electronic Design durability (lumen maintenance and battery charge control strategy)

Specs Sheet Change	Add more details on component specifications to the SSS, in particular, PV power.	Yes	We are open to adding additional information about the components if it is requested by manufacturers. There are minimum disclosure requirements outlined in the SSS requirements, but it is always OK to disclose other test results as well.	This is already allowed.
Specs Sheet Change	Require labeling on battery replaceability [note: this is already in place] and an "expected battery expiration date" on the SSS.	No	Good idea but difficult to implement. We already note if batteries are easily replaceable, but estimating the lifetime of a battery is very difficult.	n/a
Specs Sheet Change	Include option to provide FOB wholesale pricing on the SSS.	No	We do not want to list prices on the Lighting Africa web page. They are subject to change, order size, and other factors.	n/a
Tighten Lighting Africa Standards or Targets	Require that batteries are protected by an appropriate charge controller with an algorithm that prolongs the life of the battery and protects the safety of the user.	Yes	This is a hole in our current Standards framework and it makes sense to add a general requirement for this.	Require that batteries are protected by an appropriate charge controller with an algorithm that prolongs the life of the battery and protects the safety of the user. Examples of acceptable limits: Overvoltage cutoff at 2.4 volts for a sealed lead acid battery, etc. This would be a general requirement (no prescriptive requirements) with judgement allowed to be subjective by test lab and Lighting Africa.

Tighten Lighting Africa Standards or Targets	Require IP 67 for solar module junction boxes.	No	The durability of solar junction boxes is potentially a loophole in the durability requirements. We are not sure if IP67 is the correct level of protection and are looking for input.	None at this point
Tighten Lighting Africa Standards or Targets	Require consumer safety self-certification for any included AC-DC chargers	Yes	This is a low-cost way of ensuring consumers are not exposed to harm from substandard AC-DC chargers that are included with products. In practice, many products give the option to use standard mobile phone chargers, and this requirement would not apply to those if the chargers are not included in the box.	Any AC-DC charger should carry approval from a consumer electronics safety regulator.
Tighten Lighting Africa Standards or Targets	Require self-certification that uV free LEDs are used.	No	We do not know enough about the impacts on eye health at levels of potential uV exposure that would be typical for off-grid lights to require a standard here. We do our best to keep up-to-date with current thought in the area of LEDs and health, and will continue to monitor this and other issues. Please continue to send information on this and other health issues to our QA team.	n/a
Tighten Lighting Africa Standards or Targets	Add requirements for users manual content.	No	This would be difficult to implement broadly, as different lamps have different needs.	n/a
Tighten Lighting Africa Standards or Targets	Add requirement that CCT of light be in a certain range (e.g., near daylight).	No	The CCT for lamps we see in the field varies widely and we intend to continue leaving these choices up to the market.	n/a

Visual Screening Additions	Add observations of workmanship quality in and on solar module junction boxes.	Yes	This addition makes sense and would be useful to provide more information to the market. Including it would result in better feedback for manufacturers and would help protect consumers.	Add to checklist, make part of overall workmanship assessment.
Visual Screening Additions	Add observations of wire strain relief methods throughout the product, where applicable.	Yes	This makes sense and would allow us to provide better feedback to manufacturers about product design.	Add to visual screening checklist.
Visual Screening Additions	Add observations of solar module laminate construction quality.	No	This would be helpful if the assessments were standardized, but it is a difficult test to undertake by a technician without appropriate background in solar assembly. We aren't adding at this time because of the difficulties in implementing across the global lab network.	n/a
Visual Screening Additions	Add checks for replaceability of circuits in the lamp (in addition to the existing check for ease of battery replaceability.	Yes	This makes sense and would allow us to provide better feedback to manufacturers about product design. This would not be a new standard but simply added information in the test report.	Add to visual screening checklist.
Visual Screening Additions	Add more extensive documentation and feedback on user manual contents.	Yes	This makes sense and would allow us to provide better feedback to manufacturers about product design.	Add to visual screening checklist.

Visual Screening Additions	Add guidance for potential sources of damage that may be inflicted on the product by the user due to design issues (e.g., PCB too close to mounting hole, solar module frame too shallow, etc.).	Yes	It makes sense to test labs to be on the lookout for design issues that are not addressed in other tests, and to flag them.	Add to visual screening checklist.