

Seeking Stakeholder Feedback:

Proposed changes to the draft quality standards under review by the IEC

April 2019

We are midway through the process of submitting the Lighting Global Quality Standards for adoption by the International Electrotechnical Commission (IEC) and are reaching out for your feedback to inform our next steps. As discussed in prior outreach, we submitted a draft of IEC/TS 62257-13-1 last September for consideration by the IEC. This document is largely aligned with the Lighting Global Quality Standards and once adopted by the IEC, will be referenced by the Lighting Global program to cover both pico-products and solar home system (SHS) kits up to and including 350 Wp.¹ IEC adoption of the standards is expected to:

- Increase the stature of the global quality standards and thereby reduce the risk of countries adopting divergent standards;
- Provide a formal process for obtaining input from national governments, private sector companies, and other stakeholders; and
- Enable national governments to easily keep their standards synchronized with the global standards (by referencing the IEC technical specification without referencing a particular edition/version).

In December 2018, we received comments from IEC Technical Committee 82 representatives providing feedback and recommendations for changes to the draft version of IEC/TS 62257-13-1. IEC Technical Committee 82 focuses on solar photovoltaic technology and systems, and Joint Working Group 1 (JWG1) of TC 82 manages the 62257 series, which covers off-grid energy systems.

We are currently updating the draft of IEC/TS 62257-13-1 in response to these comments. In the process, we are investigating **increased PV and battery safety requirements** to include in the revised draft for submission to the IEC. We are also considering including **additional labeling and performance reporting requirements**. As we consider potential changes we have drawn from research conducted by the Lighting Global QA team and advice from battery and PV experts from Fraunhofer ISE, Intertek, SMQ, the IEC, and GOGLA's Technology Working Group. **We would now like your feedback on the proposed changes.**

To provide feedback, please review the list of changes proposed in this document and then visit <https://www.surveymonkey.com/r/ProposedChanges-13-1> to submit your comments. Please submit comments by 17 May 2019. We value your feedback and plan to use the insight you provide to ensure that the final document best meets the needs of our wide range of stakeholders.

¹ Pico-products typically have a peak power rating of less than or equal to 10 W. For the purposes of Lighting Global, solar home system (SHS) kits have peak power ratings greater than 10 W up to 350 W.

PROPOSED CHANGES to IEC/TS 62257-13-1

1. Battery safety

Based on our research and feedback from battery experts, we are proposing to add the following requirements for batteries, primarily to address recognized safety hazards associated with lithium-based batteries. We are responding to reports of recent safety incidents in the sector and the fact that lithium batteries are beginning to be more commonly used in larger products. The recent safety incidents have caused a great deal of concern among market development programs and procurement agencies. The proposed requirements below are intended to mitigate these concerns with the goal of both ensuring safe batteries and preventing the inclusion of more stringent battery specifications that might not consider the impacts to the industry. We are cognizant of the need to balance the potential benefits of new technologies with safety, and recognize that there is a cost to align with these new specifications. Our current standards require that all lithium-based batteries carry at least one battery safety certificate; the requirements proposed below would strengthen this requirement to ensure that batteries are tested at the pack level and assessed for safety during use:

- Any lithium-based battery must be tested to and meet the requirements of a standard for safety during use: either [IEC 62133-2](#), [UL 62133](#), or the combination of [UL 1642](#) and [UL 2054](#)
[Note, IEC 62133, UL 62133, and UL 2054 are for batteries used in portable applications (i.e., easily hand-carried devices), which we expect would apply to all lithium batteries currently in the Lighting Global program. Standards exist for stationary batteries, such as IEC 62619 and UL 1973, but in our estimation, these would only be applicable for much larger, truly stationary batteries.]
- Test reports must cover both the individual cell and the fully assembled battery pack.
[Note, these may be two separate documents or one single document for both cell and battery.]
- Test reports must be from a third-party test lab that is ISO/IEC 17025 accredited to the particular test.
- In the case of "similar" batteries in which the number of cells differ between models but all other characteristics are the same, each model would require testing. *[Note, the same cell test can be referenced for all batteries composed of that cell. Additionally, test results from UN 38.3 testing may be referenced in lieu of some cell-level tests in IEC 62133.]*
- Test reports would be considered valid as long as the battery has not changed and the test report was conducted to a recent version of the standard. When the solar product is being renewed, companies must either resubmit the battery safety test report(s) and confirm that the battery has not changed or provide a new battery safety test report for the new version of the battery.
- These requirements would apply to all types of lithium-based batteries, including lithium iron-phosphate (LiFePO₄) and lithium polymer batteries.

We acknowledge that some of these requirements will add an additional burden of both cost and time for battery assemblers or off-grid energy companies that assemble their own batteries,

but our research and consultation with battery experts indicate that these tests will help identify and prevent the use of poorly assembled, dangerous batteries. We recognize that many other factors contribute to battery safety, including quality control in the battery factory and proper integration into a product. We are interested to hear any recommendations you have for other measures we should take to ensure the safety of products through the Lighting Global Quality Assurance program or in the IEC specification.

2. PV safety

Several members of the IEC noted that the requirements for PV modules needed to be strengthened to better align with international standards, especially for larger modules. We are proposing to require the following:

- All PV modules greater than a set threshold shall be required to meet the requirements of [IEC 61730](#), a recognized standard for PV safety. In the previous draft of IEC 62257-13-1, this requirement applied to any modules that exceed 240 Wp or a short circuit current (I_{SC}) of 8 A or an open circuit voltage (V_{OC}) of 35 V.² We are considering reducing this threshold to also state that any module with more than 40 cells in series would also need to meet the requirements of IEC 61730. The threshold would then be:
 - Any modules with more than 40 cells in series or that exceed 240 Wp or I_{SC} of 8 A or V_{OC} of 35 V.
- **All PV modules greater than 10 W, but not tested to IEC 61730** would need to pass a modified version of the hot-spot endurance test from IEC 61730. This test is used to identify modules that could become fire hazards due to localized heating as the result of cell deformities, poor interconnection of cells, or cell mismatch. The proposed test would use a simplified method to identify and evaluate hot spots using an IR camera. The method is designed to ensure it can quickly and easily be tested by labs in the Lighting Global test network. Proof of testing to the hot-spot endurance test in IEC 61730 would also be accepted as an alternative path to meet this requirement.
- **All modules below the threshold for IEC 61730 testing, including those below 10 W**, would undergo the following additional procedures:
 - Increased visual screening including the following elements:
 - Verification of a clear and indelible label that provides the information listed for PV modules under Section 3 “New Performance Reporting Requirements” (*not required for integrated PV modules*)
 - Confirmation that PV wires are sized appropriately
 - Inclusion of delamination and other key safety issues in the product’s overall deficiency score
 - The following tests from IEC 61730. These could be performed by a test lab in the Lighting Global lab network, or as part of IEC 61730:

² Note, in the previous draft of IEC 62257-13-1, this same threshold of 240 W, 8 A and 35 V was used as a threshold to trigger additional requirements (IEC 62109-1 or UL 1741) for any components intended to be directly connected to the output of the PV module (i.e., charge controllers). We will recommend keeping this threshold for charge controller testing regardless of whether the threshold for increased PV module testing is changed.

- Durability of markings (*not required for integrated PV modules*)
- Sharp edge test (*not required for integrated PV modules*)
- Screw connection test (*for non-plug-and-play products only*)
- The impact test described in [UL 1703](#), which consists of a 51-mm diameter steel sphere being dropped from 1.295 m onto the surface of the module. The module passes if there are no accessible live parts following the test and no parts larger than 6.5 cm² are released from the module.
- A bending or folding test for flexible or foldable modules. The modules would be bent or folded 25 times and then inspected for any visual defects.

These proposed PV requirements represent a compromise with IEC committee members who initially suggested that all modules should meet the requirements of IEC 61215 and IEC 61730, regardless of size. Given the high cost and complexity of these tests, we did not think they were appropriate for many smaller modules in the off-grid sector. We reviewed the requirements of IEC 61730 and, in consultation with PV experts, identified those tests that assess safety issues that are most relevant to small modules.

3. New performance reporting requirements

To better ensure that consumers and distributors have access to basic, comparable information about product performance, we are introducing additional performance reporting requirements for SHS kits, components either packaged separately or with a kit, and PV modules. These are in addition to the existing requirements presented in the [Performance Reporting Requirements](#) policy, which have already been included in the draft of IEC 62257-13-1. We appreciate any feedback you can provide on the new proposed requirements and especially encourage responses from marketing and communications teams at off-grid product companies. Our proposed requirements are as follows:

- **Performance metrics required on the packaging or user manual for SHS kits (including kits listed as part of a [product family](#)):**
 - One solar run time profile for all of the included light points on high and any other included appliances must be provided on the packaging or in the user manual.³ (An example run time profile for a product that includes lights, a torch and a TV, and no other appliances, could be: “After a day of solar charging, you can use the main lights on high for 4 hours, the torch for 8 hours and the TV for 3 hours.”) This run time profile may also include advertised appliances, but it must clearly indicate that these appliances are not included with the kit and that the assumed power (or number of charges and battery capacity) of the advertised appliances must also be presented and representative of actual appliances that can be found in the market.
Additional run time profiles may also be presented. Reported metrics for all combinations may be subject to verification through QTM, MCM or renewal testing. As with all truth-in-advertising aspects, the reported values for each

³ If a product does not include any lights or appliances, it must still present a solar run time profile representative of the appliances it is intended to power.

- metric must be no more than 15% greater than the values determined through QTM testing as described in IEC/TS 62257-9-5.⁴
- PV module power in watts on the packaging. (Note: This requirement is already in force as part of the Lighting Global Quality Standards and was included in the original draft of IEC 62257-13-1.)
 - **Performance metrics required for all components, whether packaged with a pico or SHS kit, or included as part of a product family:**
 - All component specifications must be provided on the packaging or user manual as described below. If the component is packaged with the kit, the information shall be presented on the packaging or user manual of the kit. If the component is packaged separately from the kit, the information shall be presented on the packaging or user manual of the component. Where indicated, specifications must also be provided on the component:
 - Batteries: battery capacity in mAh or Ah and nominal voltage (must also be provided on the battery)
 - Auxiliary lighting appliance with battery: light output (or brightness) in lumens and the full battery run time for the brightest setting⁵
 - Lighting appliance without battery: lumen output (or brightness) in lumens⁵
 - Appliances without batteries: power in watts
 - Appliances with batteries: power in watts and battery capacity in mAh or Ah and nominal voltage (battery capacity must also be provided on the battery)
 - **All PV modules not integrated into a product must have the following markings on the module:**
 - name, registered trade name or registered trade mark of manufacturer;
 - type or model number designation;
 - serial number (unless marked on other part of product);
 - date and place of manufacture; alternatively, serial number allowing to trace the date and place of manufacture;
 - maximum system voltage;
 - voltage at open-circuit or Voc;
 - current at short-circuit or Isc;
 - module maximum power or Pmax.

All electrical data shall be shown as relative to standard test conditions (1000 W/m², 25 °C, AM 1.5 according to IEC TS 61836), but ratings at other test conditions (NOCT, etc.) can be included in addition to those at STC. These requirements are in alignment with the labeling requirements of IEC 61215 with the following exceptions: these

⁴ Further, if a range is provided, the best rating must be within the 15% tolerance. If a run time is advertised, it is assumed to be for solar run time and for the brightest setting, unless otherwise stated.

⁵ Only applies to appliances with light output of ≥ 15 lm. Appliances with light output < 15 lm are considered to be non-lighting appliances.

requirements do not require PV modules to report the class of protection against electrical shock and do not require tolerances to be reported for the measurements of voltage, current, or power.

4. Additional changes

The following are additional changes we intend to include in the draft of IEC 62257-13-1, either because we have already made these changes in the Lighting Global framework, or we feel it is important that they be added, as explained in each item below. We anticipate that these represent relatively minor changes, but list them here for completeness and still welcome your comments.

- **Date of manufacture:** Historically, some products have not included a way to identify the date of manufacture. A system for determining the date of manufacture for products in the supply chain is important for product manufacturers, other supply chain actors, and programs like Lighting Global. For example, knowing the date of manufacture can help in diagnosing reasons for product failure. Additionally, the information helps ensure that products selected for market check testing are appropriate for evaluating currently available stock. To increase clarity in the market and enable accurate market monitoring, we plan to require all products to be labeled with the date of manufacture or alternatively, a serial number assuring traceability of date of manufacture (i.e., the date does not necessarily have to be discernable to consumers, only to those who are able to interpret the code). If components are packaged separately, each component shall carry these component-specific markings. The label may be on the product or the packaging.
- **Ports on appliances:** Currently, we only require that ports on included appliances (such as radios and TVs) undergo the full ports and protection assessment if they are advertised or reasonably expected to be used for power delivery, such as charging mobile phones. In practice, we have found it difficult to determine whether a port should be “reasonably expected” to be used for power delivery. We plan to make this decision more explicit by requiring testing for all ports unless they are explicitly advertised on the packaging, user manual, or at the port as “not for charging.” Similar language may be accepted.
- **Extend the “Wiring and connector safety” requirement to pico-products:** Currently, SHS kits are required to meet the following: “All wires, cables and connectors must be appropriately sized for the expected current and voltage.” This is assessed primarily using a manufacturer declaration, and confirmed during testing by observing the product during normal use. We plan to extend this requirement to pico-products as it is an appropriate safety requirement regardless of product size.