

Lighting Global Quality Testing: Product Sampling

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Goals and Rationale

The Quality Testing Methodology (QTM) described in IEC/TS 62257-9-5 and the Lighting Global Solar Home System Test Methods provides valuable third party information on product performance and quality to stakeholders across the value and decision chain in the off-grid lighting market. Proper sample procurement – the first step in the testing process – is critical for maintaining the fairness and credibility of the QTM. These sampling methods are also used for market check testing and renewal of test results.

The goals of product sample procurement are:

- To randomly select the number of product samples needed for testing that are representative of those entering the retail market.
- To ensure the samples are representative of a commercial production run.
- To ensure no bias is introduced from preferential pre-selection (‘cherry-picking’) on the part of manufacturers, warehouses, or distributors.
- To efficiently ship the samples from the procurement location to the test lab(s) to minimize time in transit and to avoid delays in the testing process.

To meet those goals, Lighting Global and approved third party sampling agents will use one of two random methods for sampling: (i) retail sampling or (ii) warehouse sampling. The product samples should be selected and shipped to the test lab according to the random sampling guidelines outlined in Annex E of IEC/TS 62257-9-5 and Annex E of the Lighting Global Solar Home System Test Methods. Retail sampling is the preferred sampling method because it provides the most representative view of product performance and quality from the perspective of end-users. Warehouse sampling is also acceptable in cases where retail sampling is infeasible. For warehouse sampling, the cost of sampling is included in the Lighting Global fees paid by the manufacturer, and the manufacturer is responsible for the costs of shipping the products to the test lab. The manufacturer provides the samples at no cost to Lighting Global. When conducting retail sampling for a 2-sample primary market check test, Lighting Global typically procures the samples at no additional cost to the manufacturer. In all other cases of retail sampling, the manufacturer may pay into a fund for sample procurement through the Lighting Global fees or may be required to reimburse Lighting Global for the full cost of procuring and shipping the samples.

Retail Sampling

In the case of retail sampling, agents will select and purchase samples from a variety of retail outlets in the market. No more than six samples should be purchased at a given location and it is preferable to

procure samples from a geographically diverse set of outlets. Lighting Global may require manufacturers or distributors to provide a list of no fewer than 10 outlets where product samples are available for sale; sampling locations may be chosen from a subset of those outlets or from others that are independently identified.

Retail sampling is often cost-prohibitive, so it is acceptable to use warehouse sampling instead; this can be true even when retail sampling would be feasible. The choice of retail or warehouse sampling is left to Lighting Global's discretion.

Warehouse Sampling

Warehouse sampling is a process in which agents select representative products from among those that are stored at a warehouse, distributorship, factory, or other bulk storage location. The agent will make email or telephone contact with representatives at the sampling location at least 24 hours before sampling takes place. The following general criteria must be satisfied for warehouse sampling to take place:

- The actual **sampling location should be the main bulk storage location in the region**, and must be clearly specified prior to undertaking – unless the sampling agent specifically asks for an alternative arrangement.
- Every relevant product (i.e., those that are the model being sampled) at the location must be made available to the sampling agent.
- Stock available for sampling must meet **minimum allowable stock** requirements. If the minimum allowable stock is not available at the time of sampling, the samples will not be collected, sampling will be rescheduled and additional sampling fees will apply. The minimum stock requirements for Pico and SHS products are detailed in the “Stock Requirements” section below.
- **The samples to choose from should not be isolated from the general stock of the warehouse (e.g., stacked in the front office).** While it is acceptable and welcome for personnel at the warehouse to facilitate the sampling process, the agent should have sufficient access to the facility to ensure that the sampling criteria are being met.
- The following practices are NOT ACCEPTABLE:
 - Setting aside or isolating the minimum number of stock required for sampling.
 - *The sampling agent needs access to all the stock present.*
 - Requesting the agent to sample from a specified location or subset of the stock in the warehouse, such as from the latest production run.
 - Moving a subset of stock to an alternative site (e.g., the sales office) for sampling.
 - *The sampling location should be the typical bulk storage location in the region.*

Once the agent is satisfied the sampling criteria are met, they will use random selection procedures to pick samples from among those that are available. The procedures generally require that multiple cartons or boxes be opened with a subset of the contents chosen as samples. This ensures the goals of product sampling are met.

Stock Requirements:

- **Pico products:**
 - The required number of samples for testing is dependent on the number and type of tests required. The samples collected must not exceed 3.5% of the total available products. For QTM testing, pico products are typically sampled as complete kits and 18 samples are required, **therefore there should be no less than 500 units of stock available to sample from.**
 - Pico products can be sampled on a component basis at the discretion of Lighting Global. If the minimum stock requirement calculated for any one component exceeds 1500, a minimum stock of 1500 units will suffice.
- **SHS products:**
 - **Standard Option:** The required number of samples for testing is dependent on the number and type of tests required. The samples collected must not exceed 8% of the total available products. For QTM testing of SHS products sampled as complete kits, 12 samples are required, **therefore there should be no less than 150 units of stock available to sample from.**
 - If batteries are required during the lumen maintenance test, an additional 4 batteries shall be provided or procured, but these batteries need not be randomly sampled. Examples of products that must provide 4 additional batteries are those with batteries that have anti-tampering mechanisms and don't work when disconnected from the battery or products that have timers to turn the lights off unless receiving a PV charge.
 - **Component sampling:** Though it is more complicated, if a company wants to have components selected rather than full kits, use the following as guidelines for how many of each component need to be selected to complete the tests. If the minimum stock requirement calculated for any one component exceeds 500, a minimum stock of 500 units will suffice.
 - PV module: 9
 - PV mounting material, if applicable: 1
 - Control box with battery: 12
 - Battery only: 4 (if cell balancing or protection is included in the control box, 4 additional control boxes should be sampled as well)
 - Included lighting appliances: 9 of each type, plus an additional four multiplied by the number of that light type that are included in the kit. For instance, if a product includes five light points, three of Type A and two of Type B, select 21 samples of Type A and 17 samples of Type B. If a product only includes one of each light type, select 13 samples of each type.
 - Included non-lighting appliances (or lighting appliances that are not required to undergo the lighting tests): 9 of each type
 - Included lighting appliance with its own battery: 13 of each type

Confidentiality

Lighting Global personnel and those representing Lighting Global through third party sampling agents will ensure information gleaned during product sampling remains confidential, with the exception of

information that is required for record keeping about the sampling process by Lighting Global and the necessary information provided to the testing laboratory for the purpose of conducting testing.

Sampling Preparation Tips

Proper sample procurement is an essential component of the Quality Test Method (QTM). One of the goals of product sample procurement is to procure and efficiently ship the samples from the procurement location to the test lab(s). **Some tips to ensure sampling goes well and testing can get underway quickly are:**

1) Ensure the sampling location has at least the minimum required stock of products available for sampling.

In the case of random warehouse sampling, agents select representative products from among those stored at a warehouse, distributorship, factory, or other bulk storage locations.

2) Notify the procurement warehouse's manager of the product sampling.

Lighting Global personnel have direct contact with one or more representatives in your company who may not be located at the warehouse or sampling location. Communications issues can then arise because the warehouse (sampling location's) personnel are unaware that a sampling agent will be contacting them to schedule a random sampling of a particular product for Lighting Global testing. This generally results in delayed sample procurement and shipping, which leads to a later start date for the testing. To avoid this issue, please provide Lighting Global with the sampling location's representative's (person who will accompany sampling agent) contact information and notify them and their manager that the sampling agent will be in contact with them soon to schedule the sampling.

3) Be ready to ship the products to the designated test laboratory(-ies) on the same day the products are sampled.

It is the manufacturer's responsibility to ship the product samples to the laboratory(-ies) that will conduct the sampling. This means that all of the shipping costs (including duties, fees, etc.) are the responsibility of the manufacturer. Once the sampling agent has selected the required number of units, he/she will record the serial numbers of the samples (if available), ensure the samples are packaged for shipping, and then sign across the packaging tape to ensure no further tampering occurs with the samples before they are shipped. After this, the manufacturer should plan to get the package(s) shipped out to the test laboratory(-ies) on the same day.

Example Lighting Global Random Sampling Survey

(The manufacturer is expected to complete all questions. The on-line survey can be accessed here: <https://www.surveymonkey.com/r/LG-RandomSampling>.)

*** 1. Company Name:**

*** 2. Product to sample (name and model number):**

*** 3. Requested sampling date or date range:**
Notes - sampling may only take place after we have received your completed Manufacturer Information Form and a signed Test Agreement (a digital signature is acceptable). Completing this form serves as a confirmation that you will meet the minimum stock requirements during the time and location that you provide in this form. Sampling dates may depend on the availability of the sampling agency.

*** 4. Which Lighting Global approved test lab have you selected to test your product? Please note that not all labs are able to do all testing types. (For more details and contact information about the labs see www.lightingglobal.org/quality-assurance-program/test-laboratory-network/)**

- The Lighting Laboratory Institute for Nuclear Science and Technology (UON); Nairobi Kenya (Approved for ISM, MCM)
- Solar Lighting Laboratory, The Energy and Resources Institute (TERI); New Delhi, India (Approved for QTM, AR, AVM, ISM, MCM)
- Shenzhen Academy of Metrology and Quality Inspection (SMQ); Shenzhen, China (Approved for QTM, AR, AVM, ISM, MCM, SHS-QTM, SHS-AR, SHS-ISM, SHS-MCM)
- Schatz Energy Research Center (SERC); Arcata, California USA (Approved for QTM, AR, AVM, ISM, MCM, SHS-QTM, SHS-AR, SHS-ISM, SHS-MCM)
- Intertek HK; Kowloon, Hong Kong (Approved for QTM, AR, AVM, ISM, MCM)
- Fraunhofer Institute for Solar Energy Systems (FISE); Freiburg, Germany (Approved for ISM, SHS-QTM, SHS-AR, SHS-ISM, SHS-MCM)

5. Concerns or questions regarding sampling:

Provide the physical address of your preferred sampling location. Include the factory or warehouse name if different from your company name.

* 6. Address Line 1:

7. Address Line 2:

* 8. City:

* 9. State/Province:

* 10. Country:

* 11. Sampling contact name:

* 12. Sampling contact phone number:

13. Sampling contact email: