

# Lighting Global Webinar: Submission of Quality Standards to the IEC

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Lighting Global Quality Assurance

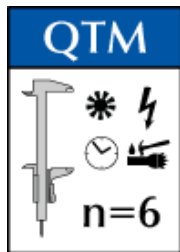
15 February 2018



# Lighting Global Quality Assurance Primary Program Elements

## Lighting Global QA Framework

Test methods and standards



Technical Specification  
62257-9-5, Ed. 3.0



Quality Standard

Testing, Verification, & Surveillance



ISO 17025 accredited  
labs for QTM testing



market check test labs

Communicating Quality to Market



[www.lightingglobal.org/products](http://www.lightingglobal.org/products)

Consumer Awareness  
Campaigns

Stakeholder Engagement



Off-Grid Solar Sector



Development Agencies



Governments



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62257-9-5, Ed. 3.0



Quality Standard

### Testing, Verification, & Surveillance

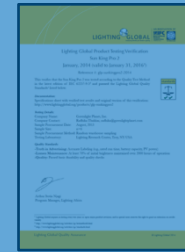


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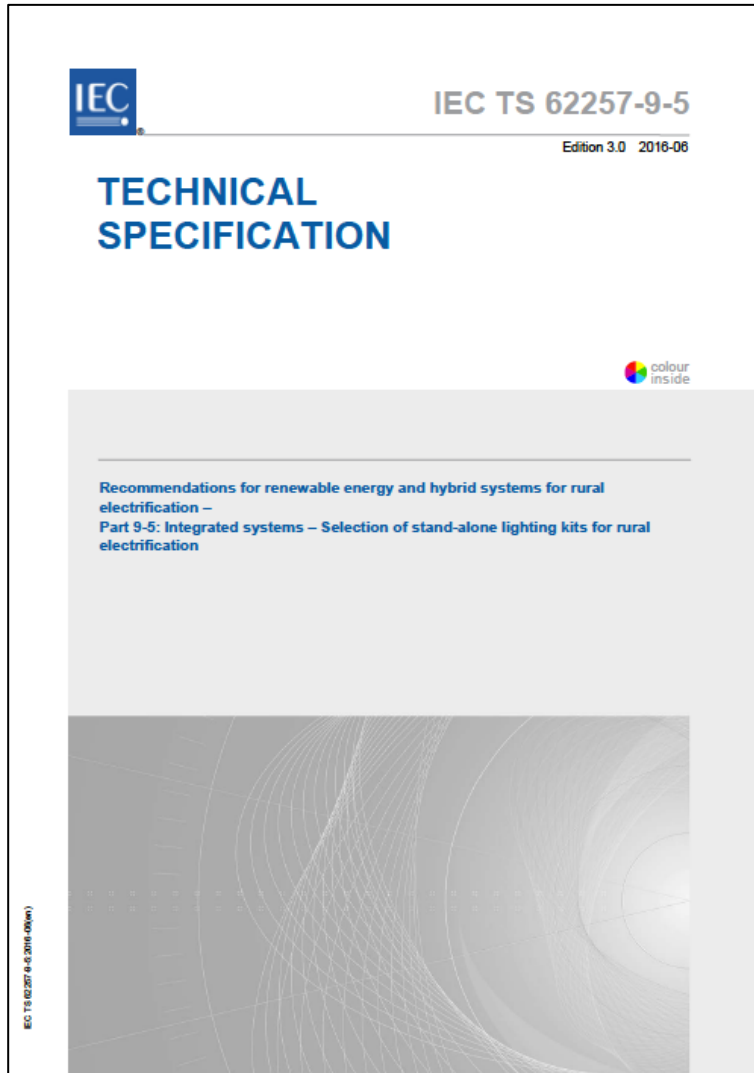
DFID Department for International Development  
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH  
Development Agencies



Governments



# Test Methods & Standards: Pico Products



- Pico products must be:
  - tested to the latest edition of IEC TS 62257-9-5
  - by a test lab that is ISO 17025 accredited for IEC TS 62257-9-5
- QTM test results are required for Lighting Global's assessment to meet the Quality Standards
  - n=6 for pico products ( $\leq 10 - 15 W_p$ )
  - 3.5% of the warehouse stock for Pico-QTM ( $\geq 500$  units); random sampling used
- Purchase document from IEC Webstore; 75% “discount” available for eligible stakeholders

# Test Methods & Standards: SHS Kits

## LIGHTING GLOBAL Solar Home System Kit Quality Assurance Protocols

Version 2

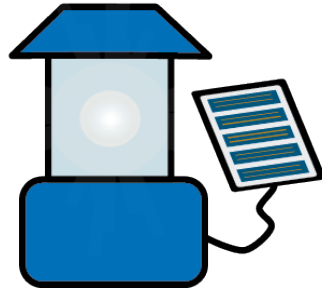
December 2016



- SHS products must be:
  - tested to the latest edition of the Lighting Global Solar Home System Test Methods
  - by a test lab that is approved by Lighting Global to conduct the SHS tests
- SHS-QTM test results are required for Lighting Global's assessment to meet the SHS Quality Standards
  - n=4 for SHS products ( $\geq 10 W_p$  &  $\leq 350 W_p$ )
  - 8% of warehouse stock for SHS-QTM ( $\geq 150$  units)
- The Lighting Global SHS test methods can be obtained from the Lighting Global QA team upon request

# Test Methods & Standards

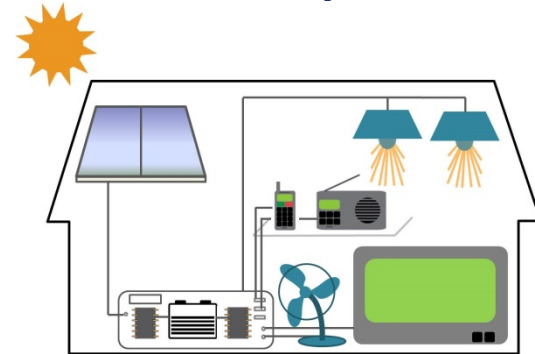
## Lighting Global Pico-Solar Quality Standards



( $\leq 10-15 W_p$ )

Category*	Metric	Quality Standard						
Truth In Advertising†	Manufacture, Model # and Product Name	Accurately specified						
	Light Output and Solar Run Time	Accurately reported on packaging for the highest setting. For other settings, if reported, accurately specified. If there are both pay-as-you-go (PAYG) and non-PAYG versions of a product, each must be truthfully advertised with respect to usage services provided.						
	Charge Rating	If reported, charge power rating accurately specified (e.g. PV power or mechanical charge time)						
	Lamp Type	If reported, accurately specified						
Lumen Maintenance	Mobile phone charging	Impact of mobile phone charging on product performance truthfully described on packaging.						
	Fee-for-service or Pay-as-you-go (PAYG) metering	The PAYG system should be capable of accurately metering service to customers or their ability to get the service that is paid for.						
	Other Aspects	If reported, accurately specified.						
Health and Safety	Lumen Maintenance at 2,000 Hours	Average relative light output $\geq 85\%$ of initial light output at 2,000 hours with only one sample allowed to fall below 75%. OR All 6 samples maintain $\geq 95\%$ of initial light output at 1,000 hours.† If an included lighting appliance provides $\geq 15$ lumens, it is subject to the lumen maintenance standard.						
	AC-DC Charge Safety	Any included AC-DC charge causes approval from a recognized consumer electronics safety certification organization.†						
Battery	Hazardous Substances Ban	No battery may contain cadmium or mercury at levels greater than trace amounts ( $<0.0001\%$ Hg and $<0.002\%$ Cd by weight in accordance with the EU Battery Directive).						
	Battery Protection	Powered by an appropriate charge controller that protects battery life and protects the safety of the user. Fewest out of 6 samples must meet the requirements outlined below.† Batteries of included appliances must also meet this standard. For PAYG systems, appropriate battery protection must remain active regardless of whether the system is in an enabled or disabled state. To avoid damage to a battery during long-term periods of non-powered disabled system states, the solar module must be able to charge the battery even if the product is in a disabled state.						
	Battery Durability	The average capacity loss of 6 samples must not exceed 35%, and only one sample may have a capacity loss greater than 20% following the battery durability usage test as defined in IEC 62175-5 Annex B8. If an included lighting appliance provides $\geq 15$ lumens, it is subject to the battery durability standard. All other appliances are not required to meet this standard.						
Quality and Durability‡§	Physical Impact Protection (the component maintaining connection at electrical connection)	<table border="1"> <tr> <td>Flame Retardant</td> <td>IP2x</td> </tr> <tr> <td>Others</td> <td>IP2x</td> </tr> <tr> <td>All PV Modules</td> <td>IP2x</td> </tr> </table>	Flame Retardant	IP2x	Others	IP2x	All PV Modules	IP2x
Flame Retardant	IP2x							
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All PV Modules	IP2x							

## Lighting Global SHS Kits Quality Standards



( $11 W_p - 350 W_p$ )

Category*	Metric	Quality Standard
Truth In Advertising†	Manufacture	Accurately specified
	Product Name & Model No.	Accurately specified
	Performance Claim: Light Output, Run Time, Appliance Power Consumption	Performance claim accurately specified.† If there are both pay-as-you-go (PAYG) and non-PAYG versions of a product, each must be truthfully advertised with respect to usage services provided.
	Lamp Type, PV Power, Battery Capacity, Charger Rating, Other Aspects	PV power must be accurately reported on the product packaging. All other aspects, if reported, must be accurately specified.
Lumen Maintenance	Fee-for-service or Pay-as-you-go (PAYG) metering	The PAYG system should be capable of accurately metering service to customers so they can fully get the service that is paid for.
	Ports	Port voltage and current specifications, if provided, must be accurate. Included appliances must function when connected to SHS ports. Power output of ports must be sufficient to power appliances that are advertised but not included. Specific guidelines for USB and 12 V ports are below.† Ports of included appliances are not required to meet this standard.
	Functionality	All advertised features must be functional. Any description of the product that appears on the packaging, inside the package and in any other media (internet, etc.) should be truthful and accurate. No statements should include boasts or end users about the features or value of the product. Any new consumer (charge indicators, SOC estimator, etc.) must be accurate.
Health and Safety	Lumen Maintenance at 2,000 Hours	Average relative light output of 4 samples $\geq 95\%$ of initial light output at 2,000 hours with only one sample allowed to fall below 85%. OR All samples maintain $\geq 95\%$ of light output at 1,000 hours.† If an included lighting appliance provides $\geq 15$ lumens, it is subject to the lumen maintenance standard.†
	Current and Overload Protection	The system must pass an overcurrent and an overload protection test. Products must include a current limiting mechanism to prevent irreversible damage to the system. The mechanism must be easily replaceable or replaceable by the user, or meet automatically reset. If replaceable fuses are used for current protection, sizes must be labeled on the device and listed on the user manual, and, if fuses are replaceable by the user, at least one spare fuse must be included with the product. Included appliances are not required to meet this standard.
Quality and Durability‡§	AC-DC Charge Safety	Any included AC-DC charge causes approval from a recognized consumer electronics safety certification organization.†
	Wiring and Connector Safety	Wires, cables and connectors must be appropriately sized for the expected current and voltage.†
	Hazardous Substances Ban	No battery may contain cadmium or mercury at levels greater than trace amounts ( $<0.0001\%$ Hg and $<0.002\%$ Cd by weight in accordance with the EU Battery Directive).

# Revision of the IEC Test Methods



Technical Specification  
62257-9-5, Ed. 4.0

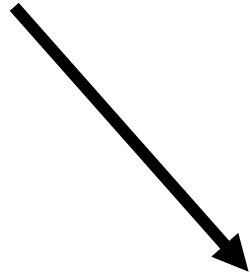
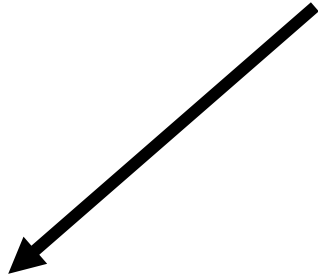
- New revision approved by the IEC on December 15, 2017
- Expect the new version to be published in the next few months
- This version includes the methods to test SHS kits, enabling all products to be tested according to the same test methods
- Changes for pico-product testing include assessing run time using the “energy service calculations” and some basic assessments of output ports (USB, 12 V or similar)

# Test Methods & Standards after IEC 62257-9-5 ed.4 is published

Pico-Solar Products AND SHS Kits will use same IEC 62257-9-5 test methods



Edition 4.0 2018-05(?)



Lighting Global Pico-Solar Quality Standards



( $\leq 10 W_p$ )

Category	Meaning	Quality Standard
Lighting	Lighting fixture	As specified
Solar	Light Output (Lumen)	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
	Charge Rate	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
Energy	Maximum Power Point (MPP)	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
	Energy Conversion	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
Safety	Energy Storage	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
	Energy Discharge	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
Quality and Reliability	Material Quality	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
	Reliability	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.

Lighting Global SHS Kits Quality Standards

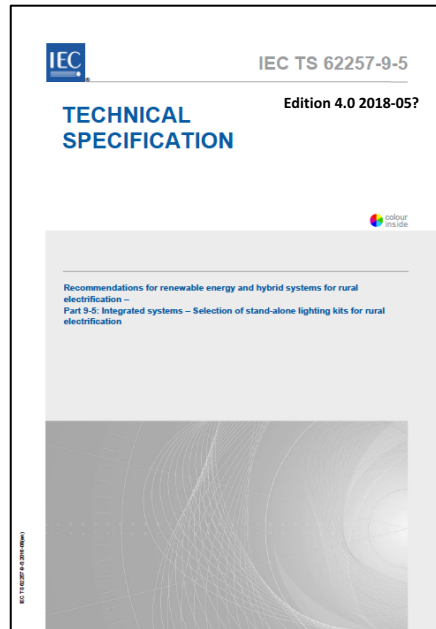


( $11 W_p - 350 W_p$ )

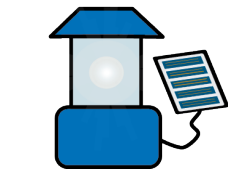
Category	Meaning	Quality Standard
Lighting	Lighting fixture	As specified
	Light Output (Lumen)	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
Solar	Light Output (Lumen)	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
	Charge Rate	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
Energy	Maximum Power Point (MPP)	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
	Energy Conversion	As specified or minimum by the lighting fixture. For the purpose of this standard, the minimum value shall be 100 lumens per watt (lm/W) at 1000 lux.
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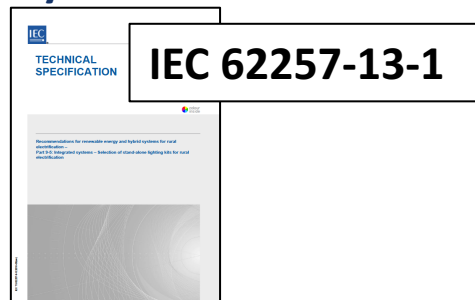
# Test Methods & Standards if Quality Standards are submitted to IEC



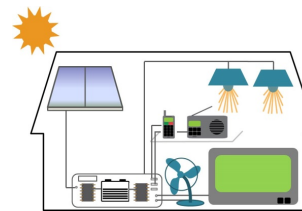
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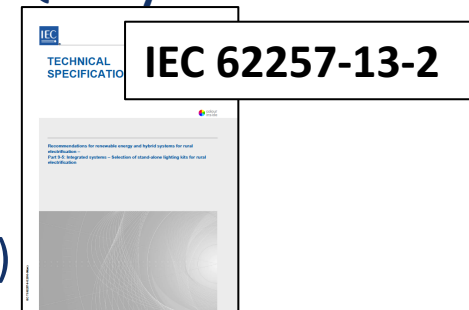
( $\leq 10 W_p$ )



## IEC SHS Kits Quality Standards



( $11 W_p - 350 W_p$ )



# Lighting Global Quality Assurance Primary Program Elements

## Lighting Global QA Framework

### Test methods and standards



**IEC** Test Methods  
62257-9-5, Ed. 4.0

**IEC** Quality Standards  
Pico-Solar:  
62257-13-1

SHS Kits:  
62257-13-2

### Testing, Verification, & Surveillance

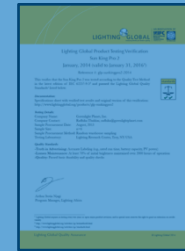


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Off-Grid Solar Sector

**DFID** Department for International Development **giz** Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH  
Development Agencies



Governments

# Submitting the Quality Standards for pico-products to the IEC



Technical Specification  
62257-13-1

- Goal is to submit a draft in April in advance of the JWG1 meeting on 2 May 2018
- Will likely take 8 – 12 months to be published
- Will continue to collect feedback on the Quality Standards that can be incorporated into future versions. Input can also be provided directly through the IEC review process after the draft has been submitted.
- Stakeholder consultation document available: <https://www.lightingglobal.org/resource/stakeholder-feedback-on-proposal-to-submit-the-quality-standards-to-the-iec/>

# Submitting the Quality Standards for pico-products to the IEC



Technical Specification  
62257-13-1

- Plan to make a few changes prior to submitting, including:
  - Accepting IEC 61427-1 certificates in lieu of battery durability tests for lithium batteries
  - Updating the eligibility criteria for AVM to enable more companies to access the pathway
  - Discontinuing the “limited-stock” option for random sampling
  - Adding standards for ports and lithium batteries
  - Raising the lumen maintenance threshold from 85% to 90%

# Plan to submit the Quality Standards for SHS kits to the IEC



Technical Specification  
62257-13-2

- Similar motivations as considered for pico-solar standards:
  - 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 harmonized with the global standards (by referencing the IEC technical specification without referencing a particular edition/version).

# Plan to submit the Quality Standards for SHS kits to the IEC



Technical Specification  
62257-13-2

- Potential drawbacks:
  - Moderately long timeline to update the standards
  - Access to standards requires payment
  - Translation of the standards more limited
  - Unequal stakeholder influence
  - National standards can still fall out of harmonization
  - Governments may adopt even if not prepared to enforce

# Plan to submit the Quality Standards for SHS kits to the IEC



Technical Specification  
62257-13-2

- Same timeline as standards for pico-solar products:
  - Goal is to submit a draft before the JWG1 meeting on 2 May 2018
  - Will likely take 8 – 12 months to be published
  - Input can still be provided directly through the IEC review process after the draft has been submitted

# Plan to submit the Quality Standards for SHS kits to the IEC



Technical Specification  
62257-13-2

- Changes to standards prior to submission:
  - Accepting outside certificates in lieu of battery durability tests for lithium batteries
  - Considering requiring IEC 62133-2:2017 and/or UL 1642 in lieu of UN 38.3 for lithium battery safety
  - Discontinuing the “limited-stock” option for random sampling
- Need to decide whether to enable SHS kits to use the AVM pathway



# Thank you for participating!

## Questions? Comments?



# Thank You!



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