

## Lighting Global Product Testing Verification LSHS Family (assembled in Ethiopia)

Expiration Date: May 31, 2019<sup>1</sup>

Verify here: [www.lightingglobal.org/products/fs-LSHSfamily](http://www.lightingglobal.org/products/fs-LSHSfamily)

This verifies that the LSHS Family (assembled in Ethiopia) product family was tested according to the Quality Test Method in the latest edition of IEC 62257-9-5, or the Lighting Global Quality Assurance Protocols for Solar Home System Kits, as applicable.<sup>2</sup> The product family **met** the Lighting Global Quality Standards.<sup>3</sup> The product family includes the following kits: LSHS 1500, LSHS 3000, LSHS 4500, LSHS 7500, LSHS 10500. Individual kits can be configured out of the listed components under the Lighting Global family certificate here: [www.lightingglobal.org/products/fs-LSHSfamily](http://www.lightingglobal.org/products/fs-LSHSfamily).



### Testing Details:

Product Name: LSHS Family (assembled in Ethiopia)  
Model Number: See list above  
Company Name: fosera Group  
Country of Origin: Thailand  
Company Contact: Guzman Zotes, [info@fosera.com](mailto:info@fosera.com)  
Original QTM Sample Size: n=4 or 6, as required by the applicable test method  
Renewal Test Conducted: n/a  
Sample Procurement Method: Random warehouse sampling  
Testing Laboratory: Schatz Energy Research Center, Arcata, CA USA

### Documentation:

Specifications book with verified test results and original version of this verification:  
<http://www.lightingglobal.org/products/fs-LSHSfamily>  
Specifications sheets with verified test results for selected systems within this product family:  
<http://www.lightingglobal.org/products/fs-LSHS7500>  
<http://www.lightingglobal.org/products/fs-LSHS10500>



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<sup>1</sup> Lighting Global requires re-testing every two years or upon major product revisions, and in special cases reserves the right to grant an extension on results validity.

<sup>2</sup> [www.lightingglobal.org/quality-assurance-program/](http://www.lightingglobal.org/quality-assurance-program/)

<sup>3</sup> [www.lightingglobal.org/quality-assurance-program/our-standards/](http://www.lightingglobal.org/quality-assurance-program/our-standards/)

# Type Approval

## LSHS Family (assembled in Ethiopia)

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Category	Quality Standard	Verdict
Truth In Advertising	Manufacturer accurately specified	Pass
	Product Name and Model Number accurately specified	Pass
	Performance and Component Ratings accurately specified. Any description of the product that appears on the packaging, inside the package and in any media shall be truthful and accurate. No statements shall mislead buyers or end users about the utility of the product. Numeric ratings must deviate no more than 15% from actual performance (note that it is acceptable for actual performance to exceed advertised performance).	Pass
Lumen Maintenance	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	Pass
AC-DC Charger Safety	Any included AC-DC charger carries approval from a recognized consumer electronics safety regulator	n/a
Battery Composition	No battery may contain cadmium or mercury at levels greater than trace amounts	Pass
Battery Protection	Protected by an appropriate charge controller that prolongs battery life and protects the safety of the user. 5 out of 6 samples must meet the requirements outlined in Lighting Global Quality Standards.	Pass
Battery Durability	The average capacity loss of 6 samples must not exceed 25% and only one sample may have a capacity loss greater than 35% following the battery durability storage test as defined in IEC/TS 62257-9-5 Annex BB* *This product also meets the Battery Longevity requirement described in KS 2542:2014: the measured capacity after storage is at least 80% of the measured capacity before storage; no more than 1/6 samples fail	Pass
Physical Ingress Protection	Minimum IP2X for all products, IP3X for PV modules, and IP5X for fixed integrated outdoor products	Pass
Water Ingress Protection	Degree of protection required is based on product type: Fixed separate (indoor): No protection required Portable separate: Occasional exposure to rain Portable integrated: Frequent exposure to rain Fixed integrated (outdoor): Permanent outdoor exposure PV modules: Outdoor rooftop installation	Pass

## Type Approval Continued

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Category	Quality Standard	Verdict
Drop Test	Fixed separate (indoor): No requirement All other products: 5 out of 6 samples are functional after drop test; none result in dangerous failures	Pass
Soldering and Electronics Workmanship	Pass soldering and electronics inspection; the maximum prevalence of bad solder joints, poor wiring or overall workmanship failure is 1 out of 6 samples in each category	Pass
Mechanical Durability	5 out of 6 samples are functional after Switch, Connector, Gooseneck and Strain Relief tests; none result in dangerous failures	Pass
Minimum Warranty Terms	Accurately specified and consumer-facing; minimum coverage of at least one year on manufacturing defects under normal use, including the battery. Detailed requirements are specified in the Lighting Global Quality Standards	Pass
Performance Reporting	Light output and the corresponding solar run time are reported on the product packaging for at least the brightest setting	Pass
	Impact of mobile phone charging on product performance is qualitatively described on packaging	Pass

Additional details on the requirements listed above are provided in the Lighting Global Quality Standards, available here:

[www.lightingglobal.org/quality-assurance-program/our-standards/](http://www.lightingglobal.org/quality-assurance-program/our-standards/)

All Quality Standards above are evaluated based on test methods described in the latest edition of IEC/TS 62257-9-5 for kits in the product family with peak power ratings less than or equal to 15 W.

Kits in the product family with peak power ratings greater than 15 W are evaluated based on the Lighting Global Quality Assurance Protocols for Solar Home System Kits and found to meet the Lighting Global Quality Standards for SHS Kits.