Global LEAP Off-Grid Fan Test Method Development Process

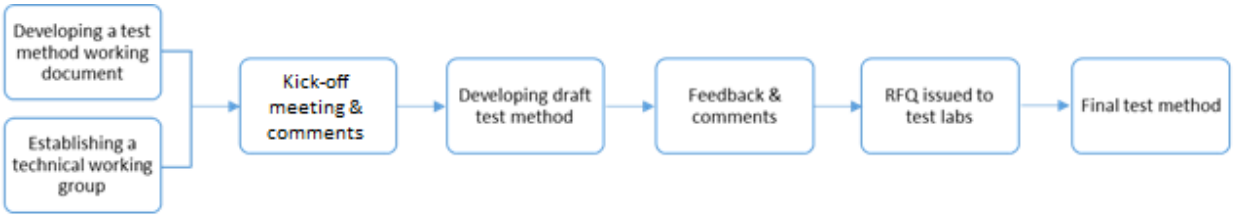
Version 1 (2016-08)

Fans are often in high demand in un- and under-electrified regions where off-grid energy systems are used. However, fans present significant technical challenges to off-grid energy systems since their operation can be energy-intensive, and they can quickly drain batteries if left running unattended. Another serious issue is the presence of low-quality, inefficient, expensive products that spoil consumer experience and raise the cost of off-grid energy services, thereby creating barriers to market development.

In response to these challenges, Global LEAP collaborated with off-grid energy industry stakeholders, appliance manufacturers, policymakers, and test facilities to develop a test method to evaluate the quality, durability, energy performance and off-grid market-appropriateness of fans. The Global LEAP Off-Grid Fan Test Method is available here.

Test Method Development Process

The test method was developed through a rigorous research, consultation, and review process as illustrated below.



CLASP initially developed a working document that highlighted product characteristics, performance parameters to be evaluated by the test method, and proposed methods for testing. The proposed methods leveraged existing IEC test methods, in particular *IEC 60879: Performance and construction of electric circulating fans and regulators*.

To develop the most suitable test method for off-grid fans, a 9-member technical working group was established to guide the test method development process. Technical and off-grid market experts, including appliance manufacturers, test laboratories, policymakers and NGOs were invited to join the working group and to provide their feedback and comments on the proposed test method.

The working group kick-off meeting was held via teleconference on 23 April 2015. The purpose of this meeting was to review and discuss the working document. Following the kick-off meeting, a draft test method was developed and circulated for comments on 27 May 2015. Comments from the working group were received by 26 June 2015. A request for quotation (RFQ) from test laboratories was issued on 10 June 2015, requesting laboratories' estimates related to testing costs and run-time as well as input into the design of the test method. Test laboratory responses and comments from the working group were received by 26 June 2015. Following the final comments from the working group members, a final test method for off-grid fans was developed and published online on 24 August 2015.

From August 2015 to June 2016, CLASP engaged test laboratories and testing experts to continue refining the components in the off-grid fan test method. A summary table, on page 4, documents the comments by test experts and revisions made to the test method.

As off-grid markets and their needs evolve, this test method will undoubtedly need to be revised. Global LEAP welcomes continued feedback on this test method from all interested parties. Please send comments, questions, or criticisms via email to GlobalLEAP@hq.doe.gov.

The Global LEAP Off-Grid Appliance Test Methods were developed using funding from the United States Department of Energy, which leads the Clean Energy Ministerial's Global LEAP initiative.

Global LEAP Off-Grid Fan Test Method Working Group Members

Hans Peter Birkhofer
Mr. Birkhofer is the Technical Director of the Global Off-Grid Lighting Association (GOGLA). He is in charge of all issues related to quality assurance and standards and is also coordinating the respective working group. Having worked in the lighting industry for more than 30 years, Hans Peter is a true expert for technical standards related to lighting products. Throughout his long lighting career, Hans Peter held several leading positions. Before going into business as an independent consultant, he was the Head of Business Development within Global Project and Sales at OSRAM focusing on LED & Lighting Electronics. He has also been the Chairman of AG DALI (Digital Addressable Lighting Interface) that initiated and promoted the new Lighting Control Standard, for more than a decade. His vast practical experience is completed by his strong educational background: He holds a Physics Diploma from the University of Freiburg, Germany and the University of Washington, Seattle.

Saurabh Diddi
Mr. Diddi is an Energy Economist at the Bureau of Energy Efficiency of India. His specialty includes energy efficiency, energy management and the power sector.

Ershadullah Ershad
Mr. Ershad is a Senior System Engineer of MAKS Renewable Energy Company Limited. He is a technical expert of renewable energy products, such as LEDs, solar charge controller, DC-DC converters, sunlight tracker and solar pump. MAKS Renewable Energy is a growing Bangladeshi renewable energy service provider which offers commercial and residential renewable energy systems for on-grid and off-grid applications.

Daniel Goldbach
Mr. Goldbach is the Head Technical Manager of Fosera GmbH&Co. KGaA. He is an expert in pico solar system and he leads the new product development at Fosera. Fosera is a leading solar home system company that offers high quality pico solar home systems for light generation, phone charging, powering of radios and TVs.

Arne Jacobson
Dr. Jacobson is Director of the Schatz Energy Research Center and Associate Professor in the Environmental Resources Engineering department at Humboldt State University. He has a Ph.D. from the Energy and Resources Group at the University of California, Berkeley, a master's degree focused on Environmental Resources Engineering (Humboldt State University), and a bachelor's degree in physics (Earlham College). His areas of research and work interest include renewable energy technologies, energy access in off-grid areas, and clean energy deployment policy. Arne's work is interdisciplinary, combining renewable energy engineering, energy policy, and a social geography based approach to international development studies. He has extensive international work experience in Africa, South Asia, and Latin America. Arne currently serves as the technical lead for product quality assurance for Lighting Global, which is associated with the Lighting Africa and Lighting Asia programs. He is also a member of Technical Committee 82 (solar photovoltaic technologies) of the International Electrotechnical Commission (IEC), an international standards body.

Md. Ashrafuzzaman Khan
Mr. Khan is the Divisional Manager of Grameen Shakti, the largest implementing partner of IDCOL's solar home system program in Bangladesh. Mr. Khan is solar home system expert who is responsible for Grameen Shakti's sales, recovery, inventory, and office & field management in 12 regions of Bangladesh.

Fahim Mahmud
Mr. Mahmud is a Senior Product Development Officer at Rahimafrooz Renewable Energy Limited. He is a technical expert in renewable energy products. Rahimafrooz is a leading Bangladeshi solar energy solution company.

Sundar Muruganandhan
Mr. Muruganandhan is the Managing Director of Superfan, a leading Indian energy-efficient ceiling fan manufacturer. Mr. Muruganandhan is a technical expert on both AC and DC fans.

Jan-Hendrik Soehlemann
Mr. Soehlemann is an advisor for GIZ Bangladesh. He has extensive experience and expertise in sustainable development, climate change, rural development and distributed renewable energy.

Original Clause in the Test Method	Comment	Comment Made By (Date)	Revision to the Test Method
None	Suggest to add a following note on the test method: *For the dc operated fan delivery with detachable AC-DC adaptor and dc cable, the dc cable shall be selected for the test.*	Kenneth Lau (TUV SUD, Shenzhen)	Added 3.1 Test Setup clause to specify the types of power cable and power supply that should be used during the tests.
5.5 Physical ingress protection test (2) Prepare and conduct the physical ingress protection test in accordance with Clause U.4.3 (Simplified IP inspection for ingress of solid foreign objects) of IEC 62257-9-5:2013.	Clause U.4.2 of IEC TS 62257-9-5:2013 only specified requirement for IP 2x and IP4x test, and no requirement for IP3x. For ingress protection testing, we recommend to use IEC60529:1989+A1:1999+A2:2013 for IP20, IP30, IP40 testing and the whole judgment of electric safety, mechanical hazard, and functional aspects.	Kenneth Lau (TUV SUD, Shenzhen)	Revised the test method to reference the IEC60529:1989+A1:1999+A2:2013, Clause 13 (*Tests for protection against solid foreign objects indicated by the first characteristic numeral*).