Appliance Testing Process

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VeraSol tests off-grid and productive use appliances (PUAs) and generates consistent and comparable performance data to fill critical information gaps and inspire market competition.[1]

Manufacturers, distributors, and other parties can submit off-grid appropriate fans, refrigerators, solar water pumps, electric pressure cookers, and nascent PUAs for third-party testing and performance evaluation. After testing, VeraSol will publish the results on the VeraSol Product Database, a tool that investors, development programs, and companies use to source and verify the performance of off-grid appliances.

This document contains information on the process for companies or organizations that are interested in testing an off-grid appliance through VeraSol. Please see Annex A for a complete checklist of steps. Once testing is completed, VeraSol acts as a third-party test results reviewer to verify data, share a product performance evaluation, and publish the data. If you would like to submit a product for testing, please review the below information, begin by contacting the appropriate test lab for a quotation, and reach out to us at testing@verasol.org if you have questions about the process.

Product Scope

VeraSol tests solar standalone fans, refrigerators, solar water pumps, electric pressure cookers, and nascent PUAs that are intended for or compatible with off-grid energy systems (e.g., low-voltage DCsystems, AC or DC mini-grids). The specific product sub-categories or other product requirements for testing are listed below:

Product	Product Sub-Categories / Other Requirements
Fans	Table, pedestal, or ceiling fans
Refrigerators	Refrigerators, refrigerator-freezer combination units, freezers, multi-temperature cabinets, or solar direct drive refrigerators
Solar Water Pumps	Surface or submersible pumps[2]
Electric Pressure Cookers	Electric cookers with a pressure cooking mode
Nascent Productive Use Appliances	Mills, egg incubators, dryers, milking machines, etc.

[1] VeraSol is an evolution of Lighting Global Quality Assurance. The program builds upon the strong foundation laid by the World Bank Group for solar energy kits and merges it with comparable product data for off-grid appliances and productive use equipment formerly housed under Equip Data. Learn more: https://www.verasol.org/

[2] The pumps must also be intended for smallhold farmer or individual household use, designed to operate at a depth anywhere from 0 meters up to 140 meters, with the flow rate up to 350 liter per minute, and with a solar energy system capacity up to 2.4 kW.

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Steps for Testing an Off-Grid Appliance through VeraSol

Complete product information form | Test lab outreach | Product sampling and shipping | Product testing | Review test results | Share results

Step 1: Complete the VeraSol Product Information Form
Please complete and submit VeraSol's product information form to provide more detailed information about the product and its performance. Please download this once completed and share it with the test lab when reaching out for a quote.

Step 2: Coordinate with Test Lab and Receive Quotation
Companies should begin by reaching out to an approved test lab under the VeraSol test lab network (see Annex B) to inquire if the lab has testing capacity, receive a timeline estimate, and request a quote. Companies are responsible for coordinating with the lab for testing.

Step 3: Product Sampling & Shipping
Companies are required to randomly sample products to be tested with a third-party sampling agent. This is to eliminate preferential pre-selection bias of products and to ensure that the test data are representative of products from a commercial run. Companies will need to coordinate with the sampling agent to identify a time and date to conduct warehouse sampling, and then the agent will randomly select samples that will be shipped for testing.

Companies need to sample **two units per model from a specified minimum stock** for testing. Two samples are required to be sampled and shipped in case of damage during transportation, but only one sample will be tested. Please include the appliance, its user manual, and warranty information. If the product is sold with a PV module, you do not need to send the PV module.

The minimum stock requirement from which the two units will be selected depends on the product type:

- **Fans**: Minimum stock of 50 units
- **Electric pressure cookers**: Minimum stock of 50 units
- **Refrigerators**: Minimum stock of 20 units[3]
- **Solar water pumps**: Minimum stock of 20 units[4]
- **Other productive use appliances**: No minimum stock or random sampling required at this time

[3] **Important information for refrigerators**: Refrigerators should include appropriate refrigerants or should include instructions for recharging the type and amount of refrigerants if they are drained for shipping.
[4] **Important information for solar water pumps**: Please sample and ship the controller.

VeraSol recommends using Intertek for product sampling (see Annex B for contact information). Companies can use an email template (see Annex C) to request random sampling. But VeraSol will accept random sampling reports from other third-party entities, if their reports include the required information below. The sampling reports need to include:

- Name and contact information of the third-party entity
- Name and contact information of inspector who conducted the sampling
- Photographs of the minimum stock in the warehouse
- Photographs of the two randomly selected samples with documented serial numbers. Serial numbers ensure that the product that arrives at the lab is the same as the one that was sampled.
- Photographs of the selected samples packed up and sealed for shipping

Companies are required to share the sampling report with VeraSol so we can ensure that the process was followed appropriately. We recommend doing this prior to testing so as to not risk invalid test results.

After the products have been randomly sampled, companies are responsible for shipping product samples to the appropriate test lab. They will also need to inform the lab that they have shipped and provide tracking information. Please refer to our shipping guide for guidance on how to ship off-grid products.

Step 4: Product Testing

Independent laboratory testing and evaluation assesses the extent to which products meet their advertised performance claims and measures the design elements that make them suitable for off-grid use. VeraSol coordinates and advises a global network of ISO-accreditedtest laboratories to test products. Testing is performed in accordance with the Global LEAP test methods for off-grid appliances:

- Global LEAP Off-Grid TV Test Method
- Global LEAP Off-Grid Fan Test Method
- Global LEAP Off-Grid Refrigerator Test Method
- Global LEAP Off-Grid Solar Water Pump Test Method
- Global LEAP Electric Pressure Cooker Test Method
- Rapid Product Assessment for Productive Use Appliances (please contact us for specific test method information)

Product testing can take between one to four months depending on the test lab's capacity and the complexity of the product. Please see Annex D for a detailed timeline estimate.

Step 5: Test Results Review

Once testing has concluded, please instruct the test lab to send the test report to VeraSol and your company in tandem. During this time, VeraSol will review the results, follow up with the test lab if necessary, and create an evaluation summary to communicate important results and recommendations. VeraSol will share the evaluation results and draft VeraSol Product Database listing with your company.

Step 6: Data Sharing
VeraSol will upload the test results into the VeraSol Product Database, an interactive, open-access online database that allows users to easily view product data. Buyers and other market actors use this database to identify and source products.

Costs

Sampling, shipping, and testing costs will be borne by the company except where noted. The company will be responsible for paying these fees directly to the sampling, shipping, and testing entities.

For more information on estimated costs associated with appliance testing, please see Annex B or reach out to each test lab for a detailed testing quote.

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Annex A: Process Checklist

Pre-testing

- ☐ Complete VeraSol's product information form and download completed form
- ☐ Reach out to appropriate test lab for quotation and share with them the completed VeraSol product information form
- ☐ Share any other product specifications with test lab

Sampling and Shipping[5]

- ☐ Prepare minimum stock based on product type
- ☐ Reach out to third party sampling entity to request sampling service
- ☐ Pay sampling fee to sampling entity
- ☐ Share random sampling report with VeraSol prior to testing
- ☐ Ship randomly selected and packed samples to the appropriate test lab
- ☐ Let the test lab know the samples are on their way and provide tracking information
- ☐ Provide any additional product shipping information as needed (i.e., refrigerant recharging instructions)

Testing

- ☐ Pay testing fees in a timely manner to ensure no delay in testing
- ☐ Request that the test lab send the test report to VeraSol when testing is completed
- ☐ Receive test report in tandem with VeraSol from the test lab
- ☐ Receive VeraSol results summary and database listing

[5] Manufacturers of nascent productive use appliances are not required to do random sampling. They can simply ship the product directly to the lab and inform the lab of the tracking information.

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Annex B: Test Lab and Sampling Agent Information and Approximate Costs

Lab	Contact Person	Phone Number	Email	Location	Product(s)	Approx. Cost per Product (USD)[6]
Intertek Hong Kong	Angela Yu	+852 96809312	angela.yu@intertek.com	Hong Kong	All for random sampling	$350–$1,200 (charged per sampling event)
TÜV SÜD Hong Kong	Sunny Yeung	+852 2788 5165	sunny.yeung@tuvsud.com	Hong Kong	Fans	$1,500–$2,000
PCSIR	Muhammad Azhar	+042 - 99231699	emtlpcsir@gmail.com	Lahore, Pakistan	Fans (Only fans sold in Pakistan)	$300–$500
Re/genT	Patrick Beks	+31 492 476365	patrick.beks@re-gent.nl	Helmond, Netherlands	Refrigerators and freezers	$4,800–$7,000
Schatz Energy Research Center	Kaileigh Vincent-Frazier	+1 707 826 4307	kgv40@humboldt.edu	Arcata, CA, USA	Solar water pumps	$4,000–$4,600[7]
Kijani Testing	Kinya Kimathi	+254 715539911	kinya.kimathi@kijanitesting.com	Kisumu, Kenya	Electric pressure cookers, nascent PUA (egg incubators, mills, agricultural sprayers)	$2,500–$3,000

[6] Please note that testing costs may vary due to product complexity.

[7] SWPs that require an alternative test method will incur additional testing costs that may be invoiced prior to test completion.

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Annex C: Request Random Sampling Email Template

You can use the following template to request random product sampling from Intertek or another third-party sampling entity. Fill in the table with your product's information and provide information for how to bill for sampling. You can copy testing@verasol.org in your outreach to the sampling agency in case you need support or have questions.

Subject: Random Sampling Request for VeraSol Appliance Testing: [Your Company Name]

Body:

Dear [XX],

I hope you are well. My company, [company name], is pursuing appliance testing with VeraSol and would like to request random sampling of our [product type], [product name], at our warehouse in [location]. Please find all the necessary information below:

Product type	
Brand name	
Model number	
Warehouse name	
Warehouse address	
Contact person at warehouse who will coordinate random sampling	
Random sampling date range	
Instructions	Select 2 units of the [model name and number] from a minimum stock of Choose an item. Package the products with packing materials provided by warehouse but with sampling entity's packing tape or sampling agent's signature across tape).

Please note that the invoice billing information for this sampling is:
[insert billing information here]

Please let me know if you have any questions. Thank you!

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Annex D: Testing Process Estimated Timeline

	Milestones	Estimated elapsed time
1	Pretesting documentation completed	Process start
2	Outreach to test lab and quotation received	+2 weeks
3	Sampling and shipping completed	+3 weeks
4	Testing completed	+4-8 weeks
5	VeraSol product evaluation completed	+1 week
6	Data publication completed	+1 week