Solar Grain Mills Evaluation: Agsol MicroMill (MMV2.1)

CLASP facilitates independent testing and conducts performance evaluations of electronic appliances based on quality, safety, durability, and truth-in-advertising. The milling machine was tested according to the Rapid Product Assessment Solar Milling Test Method. The method aims to evaluate solar-powered milling equipment intended for deployment in stand-alone applications. The test methods were developed by Kijani Testing in partnership with CLASP in support of VeraSol, a quality assurance program for off-grid solar solutions. This document contains the product's performance summary.

Product Information

Product Brand Name	Agsol MicroMill
Model Number	MMV2.1
Manufacturer Name	Agsol Ltd.
Net Weight (kg)	6.5
Dimensions (L*W*H in cm)	30*21*25
Power Supply Type	DC
Power Supply Range (W)	1000
Rated Input Voltage (V)	48
Spindle speed range (rpm)	12000
Company Contact	www.agsol.com, Matt Carr (matt@agsol.com)
Product Photo	

Sampling & Testing Information

Sampling Location	N/A
Testing Laboratory	Kijani Testing Limited
Testing Completion Date	May 30, 2023
QA Program Contact	Martha Wakoli (CLASP), mwakoli@clasp.ngo

Performance Summary

Performance Metrics	Tested Value	Tested Value
Tested screen size (mm)	1	1.2
Speed of motor and spindle (rpm)	11,798.9	11,808.6
Power input (W)	717.4	706.0
Energy consumption (Wh)	51.4	48.2
Milling conversion (%)	93.8	96.9
Throughput (kg/hour)	44.7	46.8
Energy efficiency (Wh/kg)	16.1	15.1

Quality Evaluation

Parameters		Observation	Recommendation
Quality Visual Inspection	Consumer-facing information	The milling machine had an accompanying product packaging list. The labels on the motor body can't be washed away by water and are visible.	Good and no further recommendation.
	End-use function (e.g., spice grinder, rice mill, community mill):	Grain mill	Good and no further recommendation.
Safety	Electrical shock and insulation test	All connections to the motor unit and the AC to DC converter are well insulated and not exposed to environmental conditions. The motor electrical components are well insulated and not exposed to environmental conditions.	Good and no further recommendation.
	Exposed parts that might cause bodily harm	No, the moving parts of the machine are properly sealed and cannot cause any harm to the user.	Good and no further recommendation.
	On and off switch	It is easy to access the switch, which is clearly indicated. It cannot be switched on accidentally.	Good and no further recommendation.

	Noise	The maximum recorded noise level was 68.50 dB, which is less than 70 dB and thus suitable for use in residential and commercial places.	Good and no further recommendation.
	Vibration	Vibration throughout the milling process did not exceed 0.1 m/s^2, which is within the acceptable vibration range of <0.71 m/s^2.	Good and no further recommendation.
	Temperature	Motor and body temperature did not exceed 32.8 °C, which is within the appropriate temperature range of <55 °C.	Good and no further recommendation.
Consumer Information	User Manual	The user manual highlights product parts, safety precautions, installation procedure, operation, troubleshooting, and maintenance.	Good and no further recommendation.
	Warranty Documentation	The warranty period is one year for the mill, solar charge controller, batteries, and AC to DC converter. The solar panels have a warranty of 5 years.	Good and no further recommendation.

Appendix A – Performance Metrics

The product is tested according to the Rapid Product Assessment Solar Milling Test Method and evaluated based on the criteria as of July 2023 below.

Metrics	Observation	Units
Tested screen size	The disc milling screen is used inside the mill to separate particle sizes as milled particles fall through the holes in the screen to the flour outlet. This measures the size of the holes in the screen.	Millimeters (mm)
Speed of motor and spindle	Test focuses on the motor's efficacy in transferring energy through the flywheel to the spindle.	Revolutions per minute (RPM)
Power Input	Measure the power input of the machine when milling in different mode-settings. Measured power input is compared with the manufacturer-claimed input.	Watts (W)
Energy Consumption	Measure the amount of energy used per milling session.	Watt-hour (Wh)
Milling conversion	Measure the percentage of grain that travels from the mill inlet to outlet using the mass of milled grain and the total mass of grain fed into the mill.	Percentage (%)
Throughput / Feed rate	Measure the milling speed based on the screen size and the size of the feed aperture opening, typically recorded in kg/hour. This is the **primary performance metric** for mills.	Kilograms per hour (kg/hr)
Energy Efficiency	Measure the amount of energy used to mill one kg of grain. Throughput is directly proportional to power (W) and energy (Wh).	Watt-hours per kilogram (Wh/kg)