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Buckeye vs WilliamsRDM Solar Rock Performance Test

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Company Name: WilliamsRDM, Inc.
Website: www.WilliamsRDM.com/START
Date of Incorporation: 4/1/1963
Number of Employees: 67

GSA Schedule: The solar rocks are available for purchase on the GSA Advantage website (gsaadvantage.gov) under the name Smart Solar Rock

Technology: START Covert Solar Power System

Maturity: The Covert Solar Power System is at a TRL 9, with production units sold and shipped to border patrol sectors and border sheriffs.

WilliamsRDM Inc. is a woman-owned small business located in Fort Worth, Texas, which designs and manufactures military-grade automated test equipment, cable assemblies, connectors, adapters, electronic hardware, and sensor systems. We have over five decades of experience in all phases of electrical, mechanical, and software development, all of which is designed and manufactured at our facilities in Texas. WilliamsRDM is registered to the ISO 9001 and AS9100 quality management standards.

WilliamsRDM is proud to have held a 100% rating in quality and on-time delivery to the government for consecutive years. We have also received dozens of other awards and recognitions over our five-plus decades of service to government and civilian industries alike. These recognitions and awards attest to our company's experience and expertise in developing and delivering quality products.

1 Test Summary

WilliamsRDM conducted a test to compare the battery charging performance of the Buckeye 5W and 10W solar rocks to the WilliamsRDM Covert Solar Rock. We tested one Buckeye 5W Desert Tan solar rock and two Buckeye 10W Desert Tan solar rocks alongside the WilliamsRDM covert solar rock. The Buckeye and WIlliamsRDM solar rock consist of solar panels encapsulated in a rock like housing with a connector that interfaces with the charging port on the Buckeye battery box. The Figure below shows a picture of the test setup.

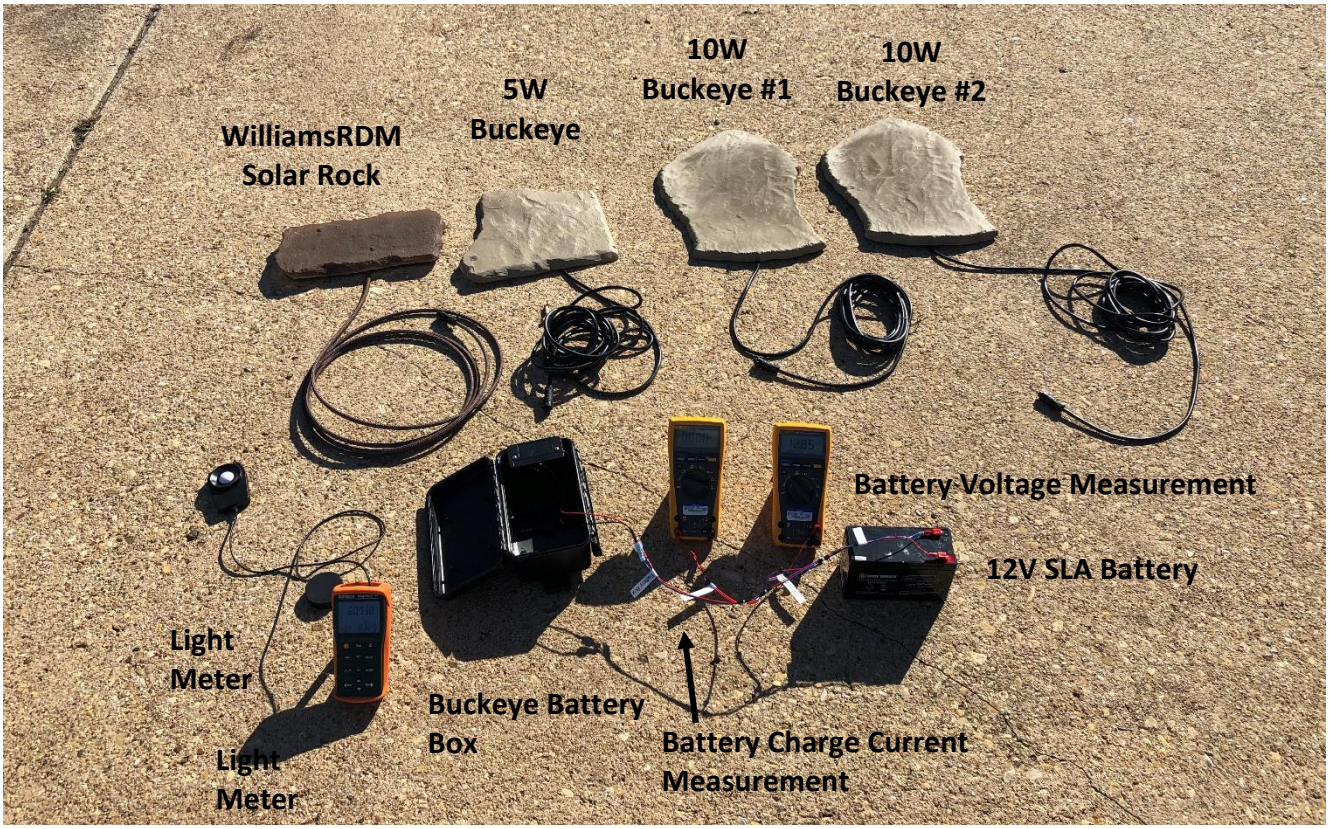


Figure 1: Test Setup

All testing was performed using a Buckeye Battery Box with a 12V 7Ah Sealed Lead Acid (SLA) battery. Each solar rock was connected to the buckeye battery box charging port and uses the box's built in charger to charge the battery. We then measured the battery voltage and charging current using two separate calibrated Fluke 177 digital multi-meters (DMMs). We then used this data to calculate the charging power provided by each solar device. Lastly, we used a light meter to measure the solar illuminance during the test.

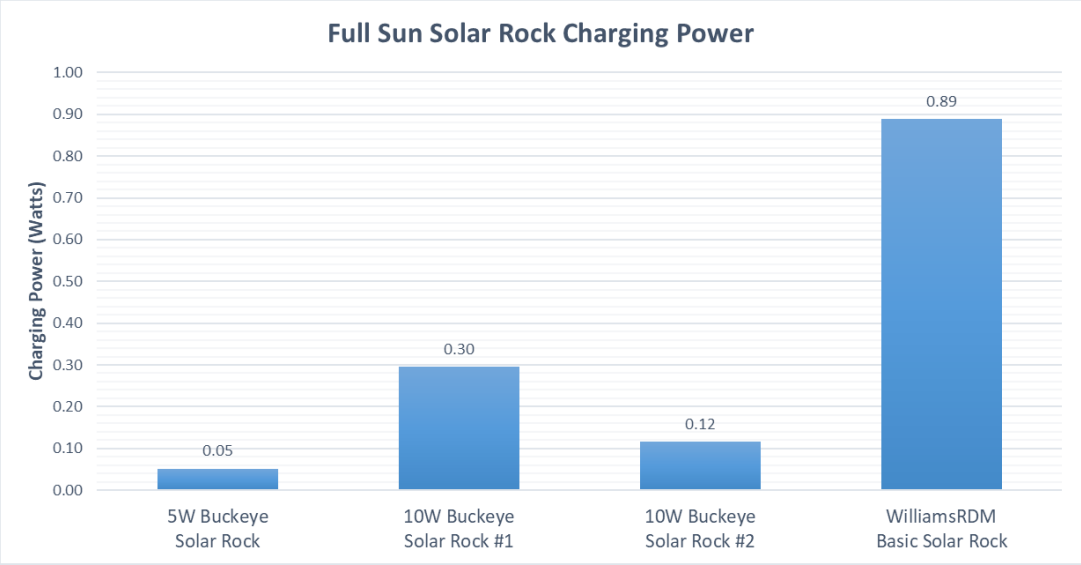
2 Full Sun Test Results

This test was performed on 11/2/2020 at 2:24 PM, the sky was clear and sunny. Solar illuminance was measured to be 60,780 lux indicating that it was a bright day. Each solar rock was connected to the battery box in succession. We then measured the battery voltage and battery charge current provided by each device using calibrated DMMs. The test results are summarized in the table below.

Table 1: Full Sun Solar Rock Charging Power

Device Under Test	Battery Voltage (V)	Battery Charge Current (mA)	Solar Panel Charge Power (W)
5W Buckeye Solar Rock	12.88	4	0.05
10W Buckeye Solar Rock #1	12.88	23	0.30
10W Buckeye Solar Rock #2	12.87	9	0.12
WRDM Solar Rock	12.89	69	0.89

The Graph below compares the charging power of the 5W and 10W buckeye solar rocks to the WilliamsRDM solar rock.



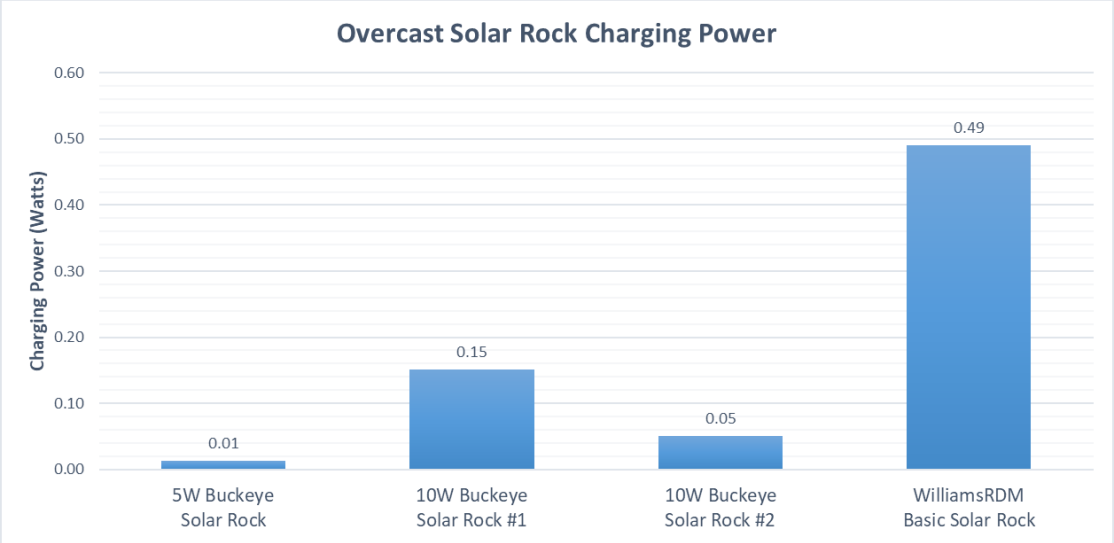
3 Overcast Day Test Results

This test was performed on 11/6/2020 at 11:16 AM, the sky was overcast. The solar illuminance was measured to be 27,700 lux indicating that it was an overcast day. Each solar rock was connected to the battery box in succession. We then measured the battery voltage and battery charge current provided by each device using calibrated DMMs. The test results are summarized in the table below.

Table 2: Overcast Day Solar Rock Charging Power

Device Under Test	Battery Voltage (V)	Battery Charge Current (mA)	Solar Panel Charge Power (W)
5W Buckeye Solar Rock	12.57	1	0.01
10W Buckeye Solar Rock #1	12.58	12	0.15
10W Buckeye Solar Rock #2	12.58	4	0.05
WRDM Solar Rock	12.58	39	0.49

The Graph below compares the charging power of the 5W and 10W buckeye solar rocks with WilliamsRDM solar rock.



4 Test Equipment

For All Tests the following Calibrated Digital Multi-Meters Were used:

1) Voltage Measurement DMM: Fluke 177, WPI266, Calibration Due 9/30/2021
2) Battery Charge Current Measurement DMM: Fluke 117, WPI037, Calibration Due 5/4/2021

5 Benefits of the WilliamsRDM Solar Rock

1) The WilliamsRDM Solar Rock Produces about 18 times the power of the Buckeye 5W solar rock and about 3 times the power of the 10W buckeye solar rock in a smaller footprint.

2) The WilliamsRDM solar rock tested in this report costs $325.00 with rodent resistant braiding standard on each assembly while the Buckeye 5W and 10W solar rocks with the rodent resistant braiding option cost $410.00[1] and $510.00[2] respectively.
3) Additionally, WilliamsRDM has a smart solar rock which costs $439.00 but includes other features such as a power point tracking solar charger and partial shading technology to provide additional power. Please see the "Buckeye vs WilliamsRDM Smart Solar Rock Performance Test" report for more information.

[1] Buckeye Rock Pricing from the Buckeye Website as of 9/4/2020

https://store.buckeyecam.com/accessories/batteries-and-chargers/solar-panels/12v-hidden-ground-solar-panel-5w

[2] Buckeye Rock Pricing from the Buckeye Website as of 9/4/2020

https://store.buckeyecam.com/accessories/batteries-and-chargers/solar-panels/12v-hidden-ground-solar-panel-10w-rock-gray