



MET Laboratories, Inc. *Safety Certification - EMC - Telecom- Environmental Simulation*

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Batteroo
310 De Duigne Drive
Sunnyvale, CA 94085

June 13, 2017

Dear Mr. Peter Pietrangelo,

Enclosed is the test data and photographs obtained from the testing of the Batteroo, Batteroo D Size Sleeves. The Batteroo D Size Sleeves was subjected to Environmental Simulation testing in accordance with Batteroo Purchase Order Number 1035.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Mary Ann Salvatin
Documentation Department

Reference: (\Batteroo\ESLU94327B-GEN)

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**Environmental Simulation Testing
Test Report**

for the

**Batteroo
Batteroo D Size Sleeves**

Tested Under

Batteriser Flashlight Verification Test Plan

MET Report: ESLU94327B-GEN

June 13, 2017

Prepared For:

**Batteroo
310 De Duigne Drive
Sunnyvale, CA 94085**

**Prepared by:
MET Laboratories, Inc.
33439 Western Avenue
Union City, CA 94587**



Batteroo
Batteroo D Size Sleeves

Environmental Simulation Testing Test Report

for the

Batteroo
Batteroo D Size Sleeves

Tested Under

Batteriser Flashlight Verification Test Plan

Testing Performed By:

Thomas Chan
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Report Prepared By:

Mary Ann Salvatin
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Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	June 13, 2017	Initial Issue.



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I. Test Results



Overview:

MET Laboratories, Inc. was contracted by Batteroo to perform testing in accordance with Batteriser Flashlight Verification Test Plan on the Batteroo D Size Sleeves, Equipment Under Test (EUT).

Description of EUT:

The Batteroo D Size Sleeves, Equipment Under Test, are custom boost converters that are attached to an ED coated stainless steel sleeve. It fits over standard alkaline batteries.



Photograph 1. View of the Batteroo D Size Sleeves

Test Setup:

The EUT was configured in accordance with the manufacturer’s instructions and to the extent possible operated in a manner representative of the typical usage of the equipment.

One flashlight with D batteries and the other flashlight with Batteroo sleeves installed over the D batteries. Light intensity was logged over time. The test ended when the flashlight with the Batteroo devices stopped functioning.

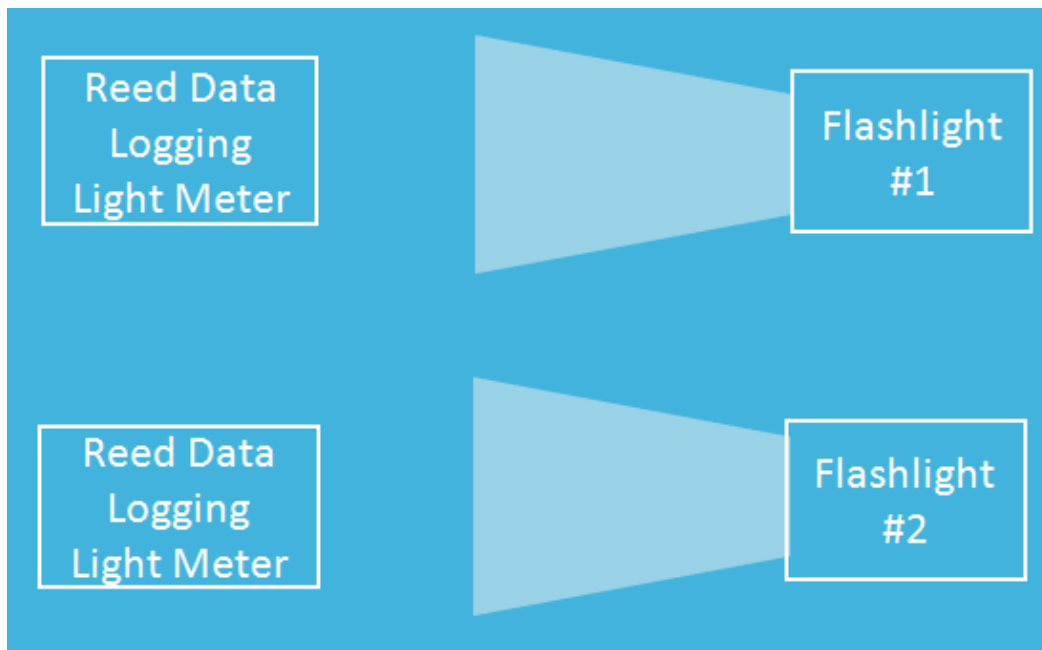


Figure 1. Block Diagram of Flashlight Test Setup

Ref. ID	Name / Description	Manufacturer	*Customer Supplied Calibration Data
1	Flashlight	N/A	Not Required
2	Flashlight	N/A	Not Required
3	Data Logging Light Meter	Reed	Not Available
4	Data Logging Light Meter	Reed	Not Available

Table 1. Customer Supplied Support Equipment used during test

Mode of Operation

The EUT manages how the power from the battery is used within the product it is installed in.

Test purpose:

Side by side comparison of two D cell flashlights to compare the light brightness between both flashlights over that time.



Flashlight Test Method:

Test Methods: Testing in accordance with the Batteriser Flashlight Verification Test Plan.

Test Procedure:

A. Two flashlights were individually placed in a cardboard box, and the card board boxes were positioned side by side for the test. See Photograph 4.

Two camera configurations were used:

- One flashlight with Batteroo sleeves installed over the D batteries.
- One flashlight without the Batteroo sleeves installed on the standard D batteries.

B. Light sensors were mounted inside each box, directly under of each flashlight mount configuration. See Photograph 2.

C. The light sensors were then connected to the data logging light meters to measure the amount of light (LUX).

D. Light data was collected until the light from both flashlight setups ended very dim (approximately 30% of the original LUX number).

Test Results: The following was documented upon completion of the test:

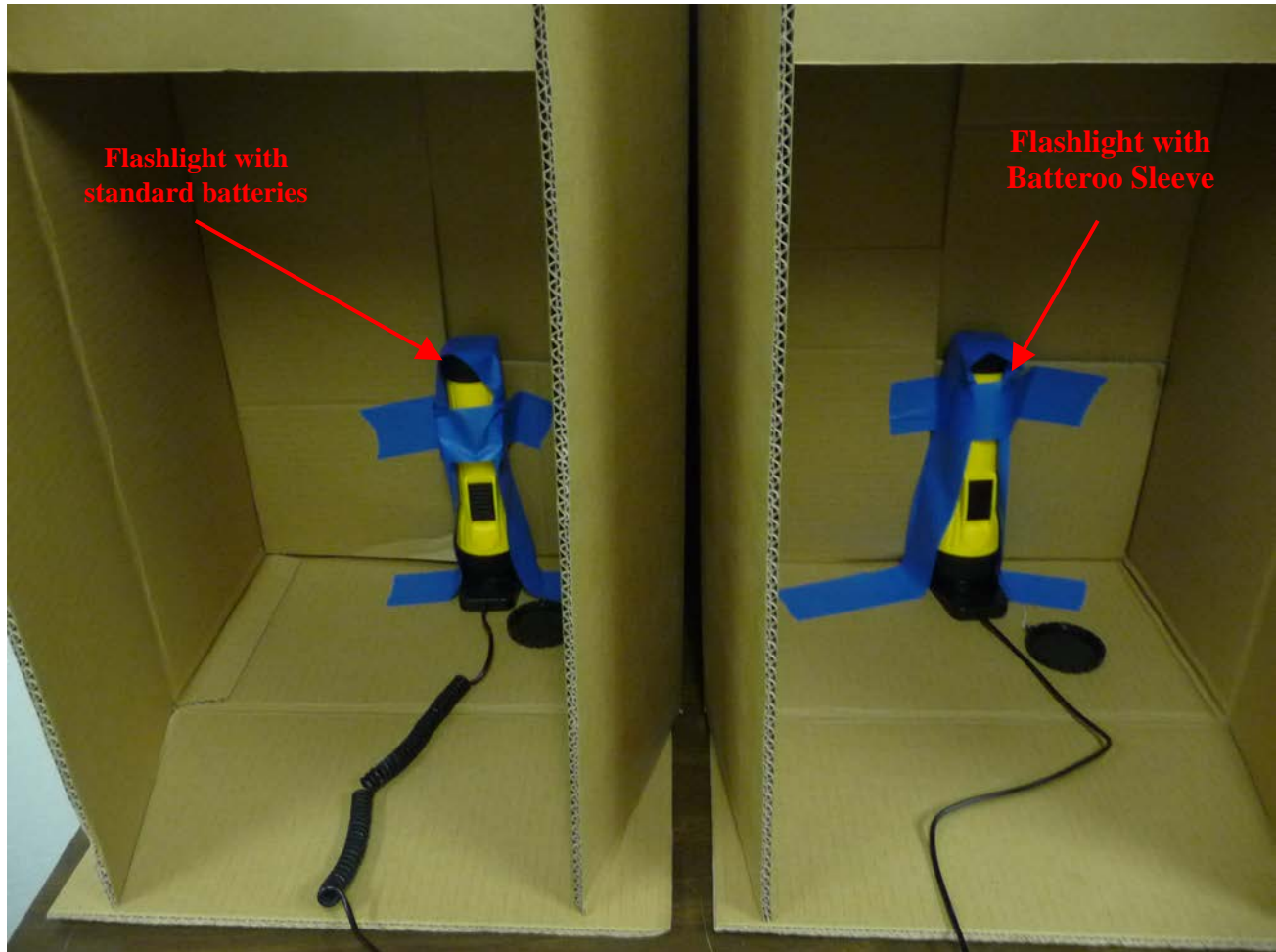
- Flashlight with Batteroo sleeves reached 30% of original lux after 3 hours 40 minutes of testing.
- Flashlight without Batteroo sleeves reached 30% of original lux after 4 hours 5 minutes of testing.

The Flashlight with Batteroo sleeves consistently had higher light output than flashlight without Batteroo sleeves. See Chart 1 and Table 2 that references these results.

Test Engineer(s): Thomas Chan

Test Date(s): 05/22/2017

Test Photos



Photograph 2. Flashlight mounted directly on top of light meter

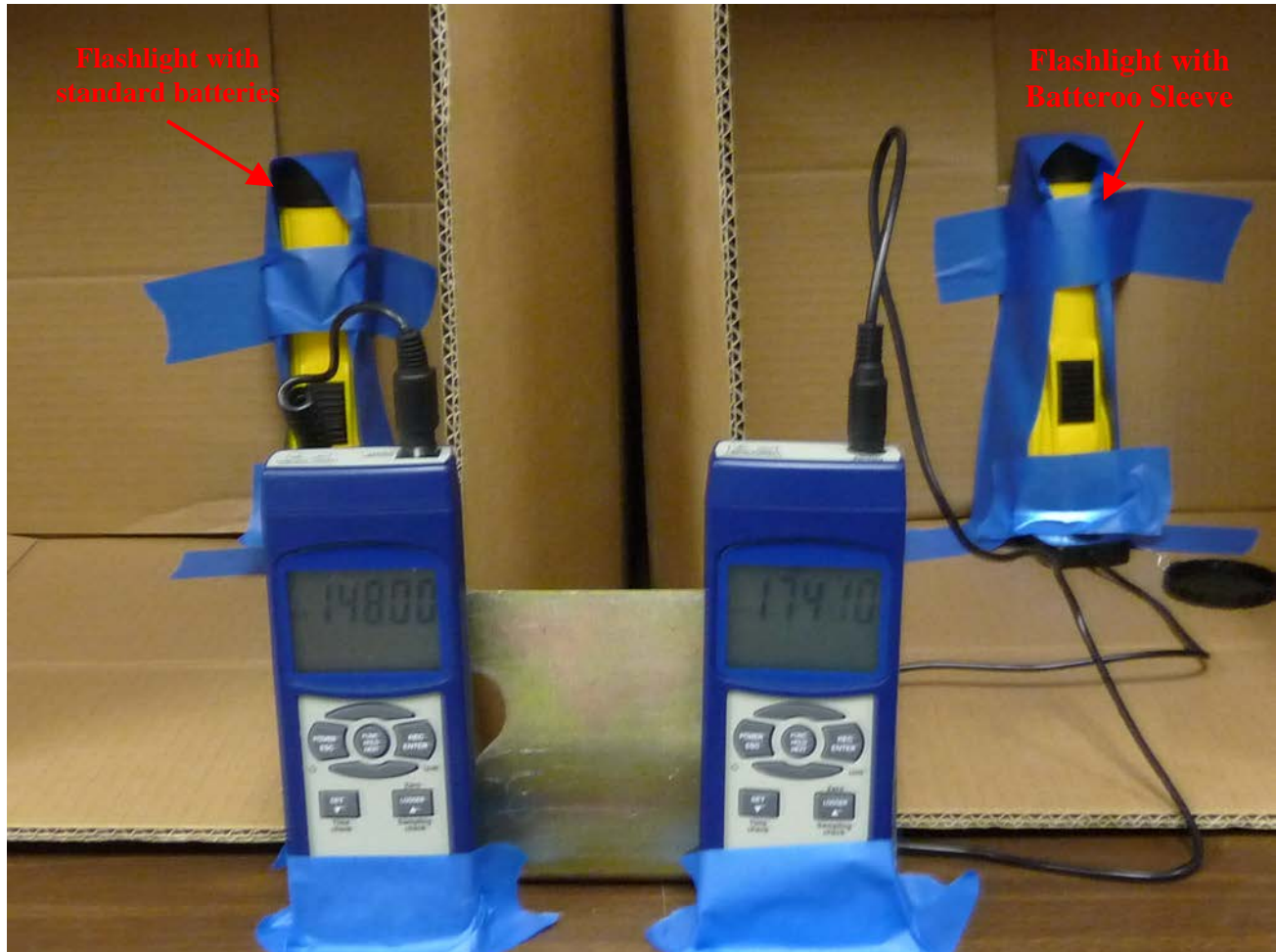


Test Photos



Photograph 3. Light Meter Display

Test Photos



Photograph 4. Flashlight Test Setup



Test Data

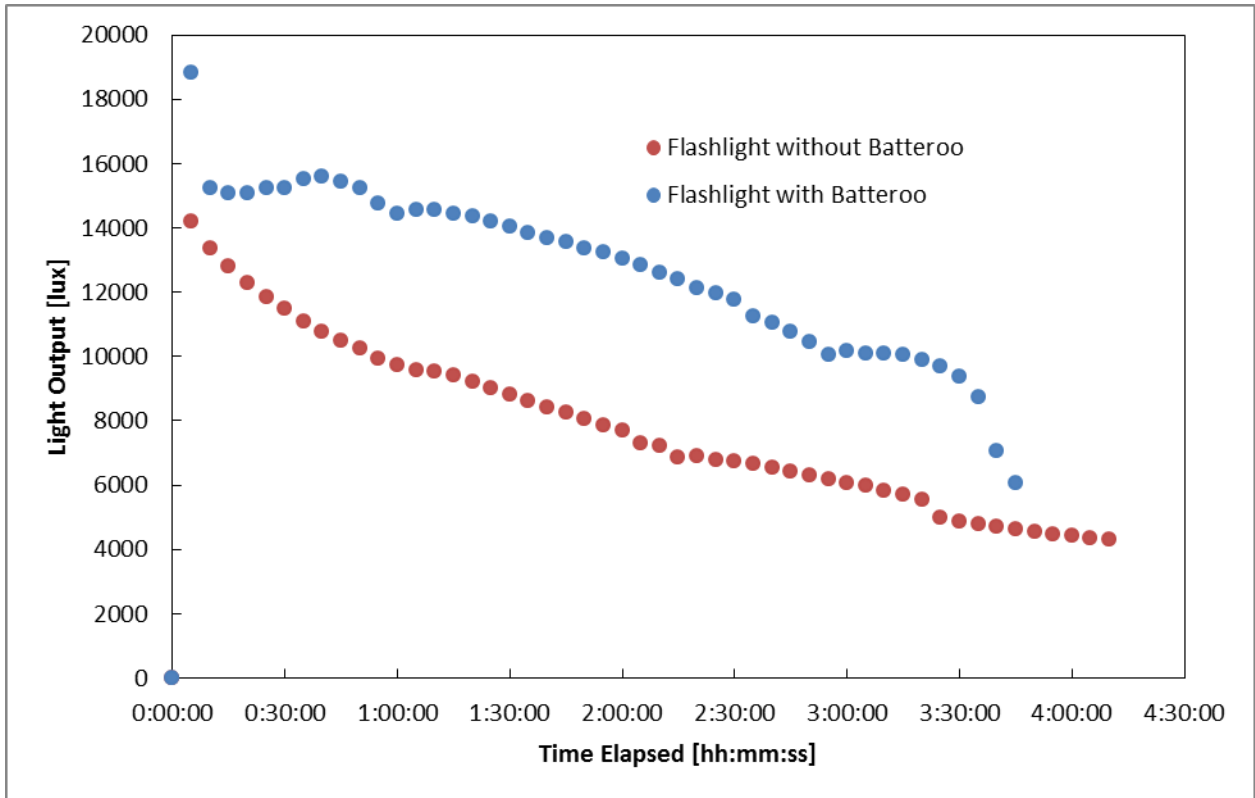


Chart 1. Light output test between flashlight with Batteroo sleeve and flashlight without Batteroo sleeve



Light output test between flashlight with Batteroo sleeve and flashlight without Batteroo sleeve		
Time Elapsed [hh:mm:ss]	Light Output of Flashlight without Batteroo [lux]	Light Output of Flashlight with Batteroo [lux]
0:00:00	0	0
0:05:00	14210	18830
0:10:00	13350	15250
0:15:00	12810	15070
0:20:00	12290	15090
0:25:00	11860	15240
0:30:00	11470	15230
0:35:00	11110	15510
0:40:00	10790	15610
0:45:00	10510	15450
0:50:00	10240	15230
0:55:00	9950	14780
1:00:00	9720	14460
1:05:00	9570	14580
1:10:00	9540	14550
1:15:00	9400	14440
1:20:00	9200	14380
1:25:00	9000	14220
1:30:00	8800	14050
1:35:00	8610	13860
1:40:00	8420	13690
1:45:00	8240	13550
1:50:00	8060	13370
1:55:00	7860	13230
2:00:00	7710	13030
2:05:00	7310	12830
2:10:00	7220	12600
2:15:00	6880	12400
2:20:00	6920	12140
2:25:00	6800	11970
2:30:00	6760	11760
2:35:00	6650	11250
2:40:00	6540	11040
2:45:00	6430	10780
2:50:00	6320	10460



Light output test between flashlight with Batteroo sleeve and flashlight without Batteroo sleeve		
Time Elapsed [hh:mm:ss]	Light Output of Flashlight without Batteroo [lux]	Light Output of Flashlight with Batteroo [lux]
2:55:00	6200	10070
3:00:00	6080	10160
3:05:00	5970	10110
3:10:00	5840	10110
3:15:00	5700	10050
3:20:00	5540	9890
3:25:00	4970	9680
3:30:00	4880	9380
3:35:00	4790	8750
3:40:00	4690	7060
3:45:00	4620	6080
3:50:00	4550	
3:55:00	4470	
4:00:00	4420	
4:05:00	4370	
4:10:00	4310	

NOTE: Values in green represent initial light output at start of test. Values in red (30% of initial value) represent the light output at the end of test.

Table 2. Light output test between flashlight with Batteroo sleeve and flashlight without Batteroo sleeve