

TEST REPORT

Reliability Laboratory

Report No.:160217-10-3

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Date: Feb 17, 2016

E-ONE MOLI ENERGY CORP.

Tainan Science-Based Industry Park No.10 Dail 2nd Rd., Shan-Hwa, Tainan City, Taiwan R.O.C.

Tel: 886-6-505-0666, Fax: 886-6-505-0777

<http://www.molicel.com>.

The following merchandise was submitted and identified by the vendor as:

Item	Information	Comments
Product Description	Lithium-Ion Rechargeable Battery	
Battery Manufacturer	E-One Moli Energy Corp	
Model No.	ICP-1003450B	
Rated Capacity	1800mAh	
Nominal Voltage	3.7V	
Charge Current	Less than 1.8A	
Charge Voltage	4.2V \pm 0.05V	
Discharge Current	3.6A	
Discharge Cutoff Voltage	3.0V	

We have tested the submitted sample(s) as requested and the following results were obtained:

Test Required : Section 38.3 Lithium metal and lithium ion batteries in UN ST/SG/AC.10/11/Rev.6

Recommendations on the TRANSPORT OF DANGEROUS GOODS Manual of

Tests and Criteria Fifth revised edition

Conclusion

Submitted samples comply with the requirement of Section 38.3 Lithium metal and lithium ion batteries in UN ST/SG/AC.10/11/Rev.6, Recommendations on the TRANSPORT OF DANGEROUS GOODS Manual of Tests and Criteria Fifth revised edition.

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Test Program:

ID	Test item	Test Conditions
T1	Altitude Simulation	Stored at a pressure of 11.6 kPa for 6 hrs at 20 ± 5 °C.
T2	Thermal Test	75 ± 2 °C(6hrs) \Leftrightarrow 40 ± 2 °C(6hrs) in 30 mins, 10 times.
T3	Vibration	7Hz \Leftrightarrow 200Hz \Leftrightarrow 7Hz in 15mins, 12 cycles for a total of 3hrs per direction, 3 detections.
T4	Shock	A half-sine shock of peak acceleration of 150g, pulse duration of 6ms, 3 shocks(+) and 3 shocks(-) per direction, 3 directions for a total of 18 shocks.
T5	External Short Circuit	External resistance of less than 0.1 ohm, case temp: 57 ± 4 °C, test time: 1hr or case temperature return, then deposit 6 hrs at 20 ± 5 °C.
T6	Crush	A cell or component cell is to be crushed between two flat surfaces. The crushing is to be with a speed of 1.5 cm/s at the first point of contact. The crushing is to be continued until the three options below is reached. (a) The applied force reaches $13\text{kN} \pm 0.78\text{kN}$ (b) The voltage for the cell drop by least 100 mV; or (c) The cell is deformed by 50% or more of its original
T7	Overcharge (Pack only)	Charge Current: 2 times $I(\text{max})$, two times $V(\text{max})$ or 22V, when $V(\text{max}) < 18\text{V}$, 1.2 times $V(\text{max})$, when $V(\text{max}) > 18\text{V}$, test time: 24hrs at 20 ± 5 °C.
T8	Forced Discharge	Discharge Current: $I(\text{max})$, 12V DC power supply and resistive load in series with cell, test time: rated capacity divided by $I(\text{max})$, then deposit 7 days at 20 ± 5 °C.

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Date of Tests:

Test Started	Test Completed
Dec 22, 2014	Jan 30, 2015

Lab Environmental Conditions:

Ambient temperature: $20\pm 5^{\circ}\text{C}$
Relative humidity: $55\pm 20\%\text{RH}$

Sample Condition:

Sample Status	Sample Size	Sample No.
1. First cycle in fully charged status	25pcs	No.1~No.25
2. After fifty cycles ending in fully charged status	10pcs	No.26~No.35

Test Equipment:

Name	Brand
Rechargeable Battery Testing System	MOLICEL
Vacuum-Temperature Cabinet	SINKU KIKO
Thermal Shock Tester	KSON
Vibration Test System	KING DESIGN
Controller Panel	KING DESIGN
Control Accelerometer	KING DESIGN
Shock Test System	KING DESIGN
Data Acquisition & Analysis System	KING DESIGN
ICP Accelerometer	KING DESIGN
Data Acquisition/ Switch Unit	HP
True RMS Multimeter	ADEX
Electronic Precision Balance	OHAUS
Impact Test System	AUTOLAND
DC Electronic Load	PRODIGT
DC Power Supply	Agilent

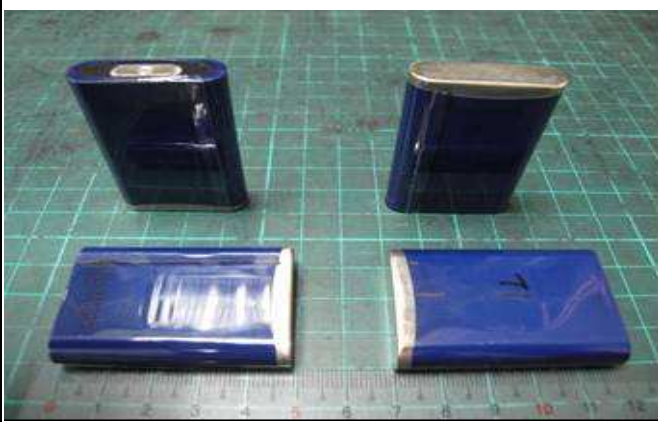
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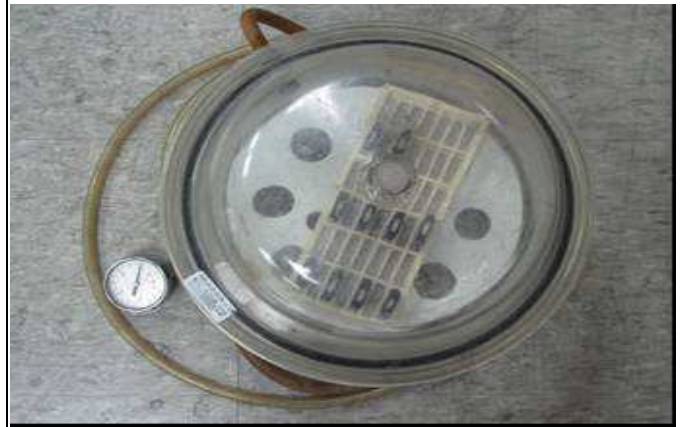
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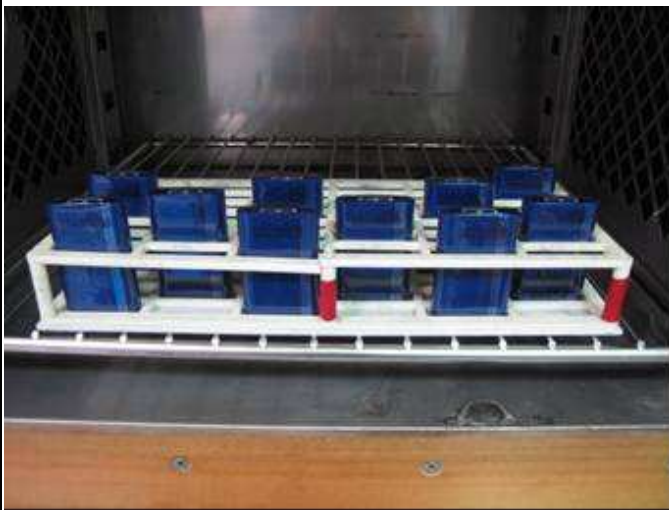
Images:



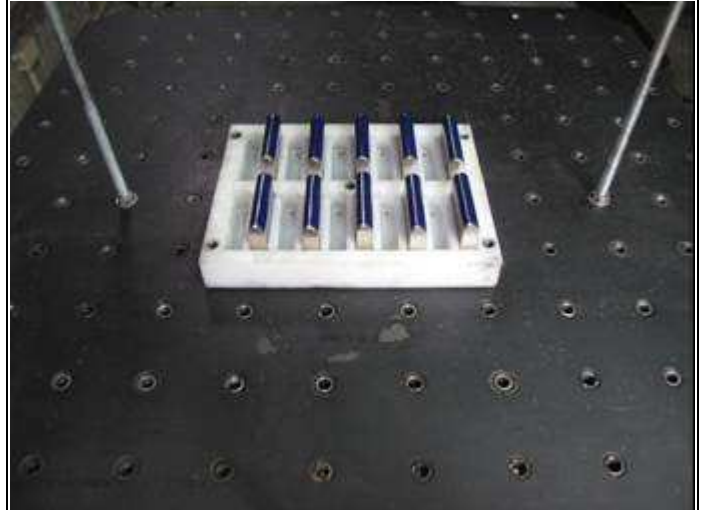
**Appearance of sample:
(1800mAh)**



T1: Altitude Simulation



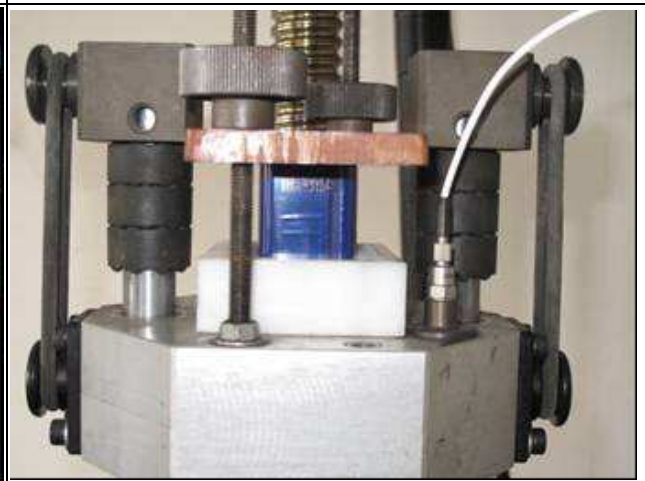
T2: Thermal Test



T3: Vibration Test



T3: Vibration Test



T4: Shock Test

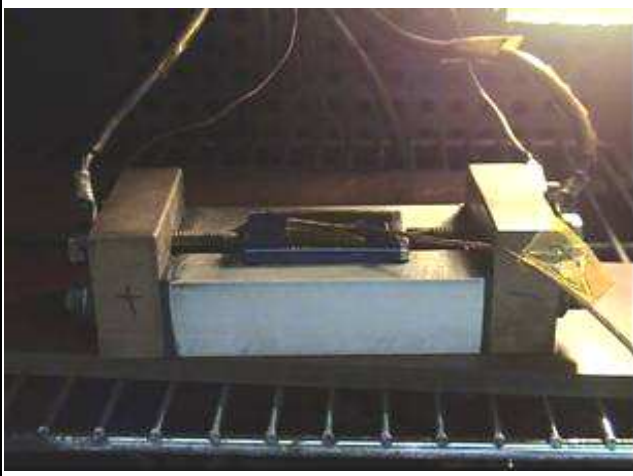
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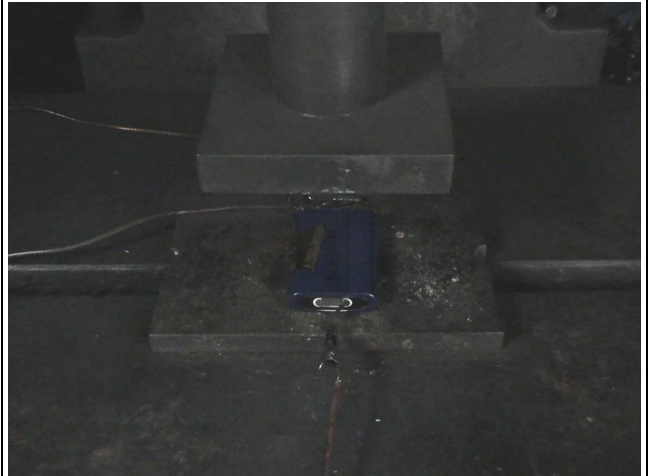
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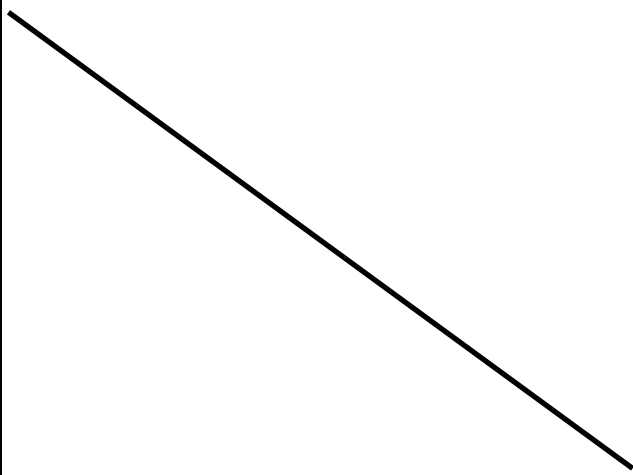
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T5: External Short Circuit Test



T6: Crush Test



T7: Over charge



T8: Forced discharge Test

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Test Result:

T1 Altitude Simulation

Model: ICP-1003450B									
Sample No.	Weight Measurement				Voltage Measurement				Appearance Check
	Initial (W ₀)	Final (W ₁)	Mass loss (W ₀ -W ₁)/W ₀	Mass loss < 0.1%	Initial (V ₀)	Final (V ₁)	(V ₁ /V ₀)	(V ₁ /V ₀) >90%	
									No leakage, No venting, No disassembly, No rupture and No fire
1	44.9961	44.9941	0.0000	0.0%	4.176	4.174	1.000	100.0%	PASS
2	44.9872	44.9851	0.0000	0.0%	4.177	4.175	1.000	100.0%	PASS
3	45.1020	45.1002	0.0000	0.0%	4.178	4.176	1.000	100.0%	PASS
4	45.1626	45.1600	0.0001	0.0%	4.174	4.172	1.000	100.0%	PASS
5	45.1112	45.1104	0.0000	0.0%	4.179	4.177	1.000	100.0%	PASS
6	45.0756	45.0756	0.0000	0.0%	4.181	4.181	1.000	100.0%	PASS
7	44.9324	44.9302	0.0000	0.0%	4.180	4.177	0.999	100.1%	PASS
8	45.1269	45.1249	0.0000	0.0%	4.180	4.178	1.000	100.0%	PASS
9	45.1269	45.3131	-0.0041	-0.4%	4.178	4.175	0.999	100.1%	PASS
10	45.1609	45.1592	0.0000	0.0%	4.180	4.178	1.000	100.0%	PASS
Conclusion	Meet the requirement of section 38.3.4.1 Test T.1: Altitude Simulation.								

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Test Result:

T2 Thermal Test

Model: ICP-1003450B									
Sample No.	Weight Measurement				Voltage Measurement				Appearance Check
	Unit:gram				Unit:Volt				
	Initial (W ₀)	Final (W ₁)	Mass loss (W ₀ -W ₁)/W ₀	Mass loss < 0.1%	Initial (V ₀)	Final (V ₁)	(V ₁ /V ₀)	(V ₁ /V ₀) >90%	No leakage, No venting, No disassembly, No rupture and No fire
1	44.9941	44.9945	0.0000	0.0%	4.174	4.143	0.993	99.3%	PASS
2	44.9851	44.9854	0.0000	0.0%	4.175	4.144	0.993	99.3%	PASS
3	45.1002	45.1003	0.0000	0.0%	4.176	4.146	0.993	99.3%	PASS
4	45.1600	45.1602	0.0000	0.0%	4.172	4.141	0.993	99.3%	PASS
5	45.1104	45.1104	0.0000	0.0%	4.177	4.144	0.992	99.2%	PASS
6	45.0756	45.0749	0.0000	0.0%	4.181	4.149	0.992	99.2%	PASS
7	44.9302	44.9302	0.0000	0.0%	4.177	4.144	0.992	99.2%	PASS
8	45.1249	45.1254	0.0000	0.0%	4.178	4.145	0.992	99.2%	PASS
9	45.3131	45.3140	0.0000	0.0%	4.175	4.143	0.992	99.2%	PASS
10	45.1592	45.1592	0.0000	0.0%	4.178	4.146	0.992	99.2%	PASS
Conclusion	Meet the requirement of section 38.3.4.2 Test T.2: Thermal test.								

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Test Result:

T3 Vibration

Model: ICP-1003450B									
Sample No.	Weight Measurement				Voltage Measurement				Appearance Check
	Initial (W ₀)	Final (W ₁)	Mass loss (W ₀ -W ₁)/W ₀	Mass loss < 0.1%	Initial (V ₀)	Final (V ₁)	(V ₁ /V ₀)	(V ₁ /V ₀) >90%	
1	44.9940	44.9944	0.0000	0.0%	4.143	4.141	1.000	100.0%	PASS
2	44.9851	44.9849	0.0000	0.0%	4.144	4.143	1.000	100.0%	PASS
3	45.0999	45.1002	0.0000	0.0%	4.145	4.144	1.000	100.0%	PASS
4	45.1601	45.1605	0.0000	0.0%	4.141	4.139	1.000	100.0%	PASS
5	45.1103	45.1103	0.0000	0.0%	4.144	4.142	1.000	100.0%	PASS
6	45.0749	45.0749	0.0000	0.0%	4.149	4.149	1.000	100.0%	PASS
7	44.9299	44.9301	0.0000	0.0%	4.144	4.143	1.000	100.0%	PASS
8	45.1245	45.1246	0.0000	0.0%	4.145	4.143	1.000	100.0%	PASS
9	45.3130	45.3127	0.0000	0.0%	4.143	4.142	1.000	100.0%	PASS
10	45.1592	45.1595	0.0000	0.0%	4.146	4.144	1.000	100.0%	PASS
Conclusion	Meet the requirement of section 38.3.4.3 Test T.3: Vibration Test.								

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Test Result:

T4 Shock

Model: ICP-1003450B									
Sample No.	Weight Measurement Unit:gram				Voltage Measurement Unit:Volt				Appearance Check No leakage, No venting, No disassembly, No rupture and No fire
	Initial (W ₀)	Final (W ₁)	Mass loss (W ₀ -W ₁)/W ₀	Mass loss < 0.1%	Initial (V ₀)	Final (V ₁)	(V ₁ /V ₀)	(V ₁ /V ₀) >90%	
1	44.9945	44.9940	0.0000	0.0%	4.143	4.143	1.000	100.0%	PASS
2	44.9854	44.9851	0.0000	0.0%	4.144	4.144	1.000	100.0%	PASS
3	45.1003	45.0999	0.0000	0.0%	4.146	4.145	1.000	100.0%	PASS
4	45.1602	45.1601	0.0000	0.0%	4.141	4.141	1.000	100.0%	PASS
5	45.1104	45.1103	0.0000	0.0%	4.144	4.144	1.000	100.0%	PASS
6	45.0749	45.0746	0.0000	0.0%	4.149	4.149	1.000	100.0%	PASS
7	44.9302	44.9299	0.0000	0.0%	4.144	4.144	1.000	100.0%	PASS
8	45.1254	45.1245	0.0000	0.0%	4.145	4.145	1.000	100.0%	PASS
9	45.3140	45.3130	0.0000	0.0%	4.143	4.143	1.000	100.0%	PASS
10	45.1592	45.1592	0.0000	0.0%	4.146	4.146	1.000	100.0%	PASS
Conclusion	Meet the requirement of section 38.3.4.4 Test T.4: Shock Test.								

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Test Result:

T5 **External Short Circuit**

Model: ICP-1003450B			
Sample No.	External Temperature Unit:°C		Appearance Check
	Temperature (T1)	T1 < 170°C	No disassembly, No rupture and No fire with in six hours
1	93	93	PASS
2	90	90	PASS
3	87	87	PASS
4	92	92	PASS
5	93	93	PASS
6	97	97	PASS
7	92	92	PASS
8	90	90	PASS
9	91	91	PASS
10	94	94	PASS
Conclusion	Meet the requirement of section 38.3.4.5 Test T5: External short circuit.		

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Test Result:

T6 Crush

Model: ICP-1003450B			
Sample No.	Impact Temperature Unit:°C		Appearance Check
	Temperature (T1)	T1 < 170°C	No disassembly, No rupture and No fire
11	21	21	PASS
12	21	21	PASS
13	21	21	PASS
14	21	21	PASS
15	21	21	PASS
Conclusion	Meet the requirement of section 38.3.4.6Test T6: Crush		

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Test Result:

Model: ICP-1003450B		
Fresh cell (SOC:0%)		
Sample No.	Forced Discharge Temperature Unit:°C	Appearance Check
	Temperature (T1)	No disassembly and No fire within seven days of the test
16	45	PASS
17	42	PASS
18	43	PASS
19	36	PASS
20	42	PASS
21	44	PASS
22	47	PASS
23	43	PASS
24	41	PASS
25	44	PASS
50 Cycled cell (SOC:0%)		
Sample No.	Forced Discharge Temperature Unit:°C	Appearance Check
	Temperature (T1)	No disassembly and No fire within seven days of the test
26	35	PASS
27	43	PASS
28	47	PASS
29	43	PASS
30	44	PASS
31	48	PASS
32	47	PASS
33	43	PASS
34	41	PASS
35	42	PASS
Conclusion	Meet the requirement of section 38.3.4.8 Test T.8: Forced Discharge	

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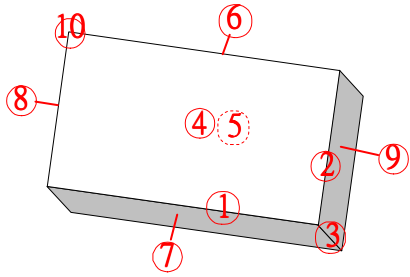
Test Summary:

Test Item	Test Result	Note
Test T.1: Altitude simulation	Pass	
Test T.2: Thermal test	Pass	
Test T.3: Vibration	Pass	
Test T.4: Shock	Pass	
Test T.5: External short circuit	Pass	
Test T.6: Crush Test	Pass	
Test T.8: Forced discharge Test	Pass	

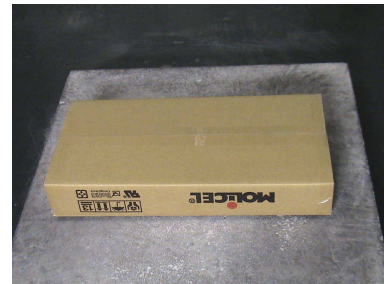
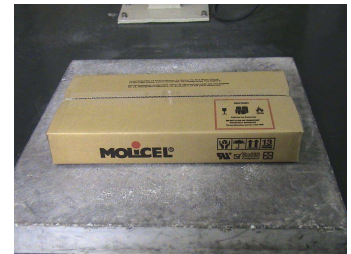
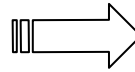
— — — The End of Test Report — — —

ICP1003450B 1.2m Drop test

(Pass, without damage and shifting of contents)



After drop



Certificate of Compliance

E-ONE MOLI ENERGY CORP.

Tainan Science-Based Industry Park
No. 10 Dail 2nd Rd., Shan-Hwa, Tainan City,
Taiwan R.O.C.
Tel: 886-6-505-0666, Fax: 886-6-505-0777
<http://www.molicel.com>.

Issue Date: Feb 17, 2016

The following products have been tested in accordance with the UN document titled 'AMENDMENTS TO THE FIFTH REVISED EDITION OF THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS, MANUAL OF TESTS AND CRITERIA (Refer to UN ST/SG/AC.10/11/Rev.6)' and found to comply with the stated criteria:

<u>Item</u>	<u>Product Part No</u>	<u>Rated Capacity</u>
1	ICP-1003450B	1.8Ah

All test records are maintained on file at E-One Moli Energy Corp.

Sincerely,



2016/2/17

Product Evaluation Engineer, QA