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UN 38.3 CERTIFICATE OF COMPLIANCE

Test Report Number: **UN10-0007**

Issue Date: **06-Apr-10**

The following product(s) have been evaluated and found to be in compliance with the Fourth Revised Edition of the UN Manual of Tests and Criteria, Sec. 38.3, Lithium Batteries (ST/SG/AC.10/11/Rev.4):

Customer Part Number(s):	52-0000-5250-7 TR-332 High Capacity Bat 1/Case
	70-0715-6359-0 TR-332 High Capacity Bat 1/Case
Ampergen Model Number(s):	78-8150-0831-9
Nominal Voltage (V):	11.1
Minimum Capacity (mAh):	4800
(Equivalent) Lithium Contents (g):	4.32
Watt-hour Rating (Li-ion/polymer only) (Wh):	53.2
Part Number of Cell Used:	ICR18650J
Cell Manufacturer:	Molice

Characteristics of the Tested Product per the Referenced Standard

- | | | | |
|--|--|---|--|
| ☒ Battery Pack | ☐ Primary (Non-rechargeable) | ☒ Small | ☐ Prismatic (applies to cells only) |
| ☐ Cell | ☒ Secondary (Rechargeable) | ☐ Big | ☐ Non-prismatic (applies to cells only) |

*Small battery is defined as a battery composed of small cells, and in which the aggregate lithium contents of all cell anodes, when fully charged, is not more than 500g.

*Small cell is defined as a cell in which the lithium contents of the anode, when fully charged, is not more than 12g.

*Lithium-equivalent contents for Li-ion cells is calculated as 0.3 times the cell in ampere-hour, with the result expressed in grams.

The lithium-equivalent contents of a battery equals the sum of the grams of lithium-equivalent contents contained in the component cells of the battery.

Test Performed	Standard Section	Description	Result (Pass/Fail)	Comments
T1	38.3.4.1	Altitude Simulation	Pass	
T2	38.3.4.2	Thermal Test	Pass	
T3	38.3.4.3	Vibration	Pass	
T4	38.3.4.4	Shock	Pass	
T5	38.3.4.5	External Short Circuit	Pass	
T6	38.3.4.6	Impact (Cell Only)	Omitted	Cell is already UN 38.3 certified
T7	38.3.4.7	Overcharge	Pass	
T8	38.3.4.8	Forced Discharge (Cell Only)	Omitted	Cell is already UN 38.3 certified

Notes:

*See attached UN 38.3 certification for cell.

	COMPILED BY	ENGINEERING	QUALITY CONTROL	MANAGEMENT
Signature:				
Date:	06-Apr-10	06-Apr-10	06-Apr-10	06-Apr-10
Typed Name:	Avisai Esteban	Linh Pham	Jorge Macias	Gary Papas
Title:	Design Engineering	Dir. of Engineering	Sr. QC Manager	General Manager



TEST 1: Altitude Simulation (Section 38.3.4.1)

Test Report Number: **UN10-0007**

Performed By: **A. Esteban**

Test Start Date: **15-Mar-10**

Test Finish Date: **15-Mar-10**

Purpose:

This test simulates air transport under low-pressure conditions.

Test Procedure:

Test batteries shall be stored at a pressure of 11.6kPa (0.116bar) or less for at least 6 hours at ambient temperature (20±5°C).

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Vacuum Chamber	VWR 1490, P/N 9100845	11062209	N/A
Voltmeter	Hioki 3560	080732566	22-Sep-10
Scale	Acculab ATL-4202-1	24550089	1-Mar-11

Test Data:

Sample	Charge State	Before Test		After Test		Mass Loss (%)	Pass/Fail ≤0.1%	Voltage Retention (%)	Pass/Fail ≥90%	Event	TEST PASSED
		Mass (g)	Voltage (V)	Mass (g)	Voltage (V)						
1	1C	381.88	12.313	381.90	12.303	-0.01%	Pass	99.92%	Pass	0	
2	1C	381.77	12.313	381.79	12.296	-0.01%	Pass	99.86%	Pass	0	
3	1C	383.60	12.300	383.59	12.288	0.00%	Pass	99.90%	Pass	0	
4	1C	381.62	12.272	381.63	12.260	0.00%	Pass	99.90%	Pass	0	
5	50C	379.95	12.354	379.98	12.339	-0.01%	Pass	99.88%	Pass	0	
6	50C	380.63	12.368	380.63	12.354	0.00%	Pass	99.89%	Pass	0	
7	50C	382.09	12.380	382.07	12.364	0.01%	Pass	99.87%	Pass	0	
8	50C	378.87	12.399	378.85	12.382	0.01%	Pass	99.86%	Pass	0	
9	1D	378.66	10.447	378.68	10.353	-0.01%	Pass	n/a	n/a	0	
10	1D	380.93	10.614	380.93	10.543	0.00%	Pass	n/a	n/a	0	
11	1D	378.85	10.730	378.87	10.671	-0.01%	Pass	n/a	n/a	0	
12	1D	377.17	10.339	377.20	10.230	-0.01%	Pass	n/a	n/a	0	
13	50D	382.46	10.861	382.45	10.830	0.00%	Pass	n/a	n/a	0	
14	50D	381.22	10.989	381.24	10.979	-0.01%	Pass	n/a	n/a	0	
15	50D	381.18	10.722	381.18	10.682	0.00%	Pass	n/a	n/a	0	
16	50D	381.08	10.541	381.08	10.488	0.00%	Pass	n/a	n/a	0	

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	No leakage or mass loss > 0.1%; voltage retention > 90%	Pass
1	Leakage or mass loss > 0.1%	Fail
2	Voltage retention < 90%	Fail
3	Cell/battery vents as designed without rupture or disassembly	Fail
4	Cell/battery ruptures without ejection of solid material	Fail
5	Cell/battery ruptures with ejection of solid material	Fail
6	Cell/battery ruptures with flame or spark	Fail



TEST 2: Thermal Test (Section 38.3.4.2)

Test Report Number: **UN10-0007**Performed By: **A. Esteban**Test Start Date: **16-Mar-10**Test Finish Date: **22-Mar-10**

Purpose:

This test assesses battery seal integrity and internal electrical connections. The test is conducted using rapid and extreme temperature changes.

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Temp Shock Chamber	Thermal Shock Chamber TSV-40S	640097	N/A
Voltmeter	Hioki 3560	080732566	22-Sep-10
Scale	Acculab ATL-4202-1	24550089	1-Mar-11

Test Procedure:

Test batteries shall be stored at a temperature equal to $75 \pm 2^\circ\text{C}$ for at least 6 hours, then at $-40 \pm 2^\circ\text{C}$ for at least 6 hours (maximum transition between the 2 temperature ranges must be less than 30 minutes). Repeat 10 cycles, then store samples at ambient temperature ($20 \pm 5^\circ\text{C}$) for 24 hours before taking voltage and mass measurements.

Test Data:

Sample	Charge State	Before Test		After Test		Mass Loss	Pass/Fail	Voltage Retention	Pass/Fail	Event	Test Comments/Verdict
		Mass	Voltage	Mass	Voltage						
		(g)	(V)	(g)	(V)	(%)	$\leq 0.1\%$	(%)	$\geq 90\%$		
1	1C	381.90	12.303	381.84	12.292	0.02%	Pass	99.91%	Pass	0	TEST PASSED
2	1C	381.79	12.296	381.72	12.291	0.02%	Pass	99.96%	Pass	0	
3	1C	383.59	12.288	383.55	12.280	0.01%	Pass	99.93%	Pass	0	
4	1C	381.63	12.260	381.58	12.252	0.01%	Pass	99.93%	Pass	0	
5	50C	379.98	12.339	379.92	12.320	0.02%	Pass	99.85%	Pass	0	
6	50C	380.63	12.354	380.59	12.338	0.01%	Pass	99.87%	Pass	0	
7	50C	382.07	12.364	382.03	12.347	0.01%	Pass	99.86%	Pass	0	
8	50C	378.85	12.382	378.82	12.364	0.01%	Pass	99.85%	Pass	0	
9	1D	378.68	10.353	378.63	10.277	0.01%	Pass	n/a	n/a	0	
10	1D	380.93	10.543	380.87	10.494	0.02%	Pass	n/a	n/a	0	
11	1D	378.87	10.671	378.81	10.633	0.02%	Pass	n/a	n/a	0	
12	1D	377.20	10.230	377.14	10.141	0.02%	Pass	n/a	n/a	0	
13	50D	382.45	10.830	382.40	10.825	0.01%	Pass	n/a	n/a	0	
14	50D	381.24	10.979	381.18	10.996	0.02%	Pass	n/a	n/a	0	
15	50D	381.18	10.682	381.11	10.669	0.02%	Pass	n/a	n/a	0	
16	50D	381.08	10.488	381.01	10.457	0.02%	Pass	n/a	n/a	0	

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	No leakage or mass loss $> 0.1\%$; voltage retention $> 90\%$	Pass
1	Leakage or mass loss $> 0.1\%$	Fail
2	Voltage retention $< 90\%$	Fail
3	Cell/battery vents as designed without rupture or disassembly	Fail
4	Cell/battery ruptures without ejection of solid material	Fail
5	Cell/battery ruptures with ejection of solid material	Fail
6	Cell/battery ruptures with flame or spark	Fail



TEST 3: Vibration (Section 38.3.4.3)

Test Report Number: **UN10-0007**

Performed By: **A. Esteban**

Test Start Date: **22-Mar-10**

Test Finish Date: **24-Mar-10**

Purpose:

This test simulates vibration during transport.

Test Procedure:

Samples are subjected to vibration of sinusoidal waveform with a logarithmic sweep between 7Hz and 200Hz and back to 7Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of 3 mutually perpendicular mounting positions of the sample. 1 of the directions of vibration must be perpendicular to the terminal face. The logarithmic frequency sweep is as follow: from 7Hz a peak acceleration of 1g_n is maintained until 18Hz is reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 8g_n occurs (approximately 50Hz). A peak acceleration of 8g_n is then maintained until the frequency is increased to 200Hz.

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Vibration Machine	Bruel & Kjaer PA1000L CE	N992 13367/000030	N/A
Voltmeter	Hioki 3560	080732566	22-Sep-10
Scale	Acculab ATL-4202-1	24550089	1-Mar-11

Test Data:

Sample	Charge State	Before Test		After Test		Mass Loss	Pass/Fail	Voltage Retention	Pass/Fail	Event	Test Comments/Verdict
		Mass (g)	Voltage (V)	Mass (g)	Voltage (V)						
1	1C	381.84	12.292	381.87	12.280	-0.01%	Pass	99.90%	Pass	0	TEST PASSED
2	1C	381.72	12.291	381.72	12.278	0.00%	Pass	99.89%	Pass	0	
3	1C	383.55	12.280	383.58	12.265	-0.01%	Pass	99.88%	Pass	0	
4	1C	381.58	12.252	381.60	12.240	-0.01%	Pass	99.90%	Pass	0	
5	50C	379.92	12.320	379.90	12.310	0.01%	Pass	99.92%	Pass	0	
6	50C	380.59	12.338	380.61	12.333	-0.01%	Pass	99.96%	Pass	0	
7	50C	382.03	12.347	382.04	12.317	0.00%	Pass	99.76%	Pass	0	
8	50C	378.82	12.364	378.82	12.360	0.00%	Pass	99.97%	Pass	0	
9	1D	378.63	10.277	378.65	10.265	-0.01%	Pass	n/a	n/a	0	
10	1D	380.87	10.494	380.86	10.480	0.00%	Pass	n/a	n/a	0	
11	1D	378.81	10.633	378.86	10.610	-0.01%	Pass	n/a	n/a	0	
12	1D	377.14	10.141	377.15	10.145	0.00%	Pass	n/a	n/a	0	
13	50D	382.40	10.825	382.42	10.820	-0.01%	Pass	n/a	n/a	0	
14	50D	381.18	10.996	381.12	10.953	0.02%	Pass	n/a	n/a	0	
15	50D	381.11	10.669	381.12	10.530	0.00%	Pass	n/a	n/a	0	
16	50D	381.01	10.457	381.05	10.365	-0.01%	Pass	n/a	n/a	0	

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	No leakage or mass loss > 0.1%; voltage retention > 90%	Pass
1	Leakage or mass loss > 0.1%	Fail
2	Voltage retention < 90%	Fail
3	Cell/battery vents as designed without rupture or disassembly	Fail
4	Cell/battery ruptures without ejection of solid material	Fail
5	Cell/battery ruptures with ejection of solid material	Fail
6	Cell/battery ruptures with flame or spark	Fail

**TEST 4: Shock (Section 38.3.4.4)**Test Report Number: **UN10-0007**Performed By: **A. Esteban**Test Start Date: **25-Mar-10**Test Finish Date: **25-Mar-10****Purpose:**

This test simulates possible impacts during transport.

Test Procedure:

Small batteries are subjected to a half-sine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds.

Each sample shall be subjected to 3 shocks in the positive direction followed by 3 shocks in the negative direction of 3 mutually perpendicular mounting positions of the samples for a total of 18 shocks.

Large batteries shall be subjected to a half-sine shock of peak acceleration of 50gn and pulse duration of 11 milliseconds, 3 shocks in the positive direction followed by 3 shocks in the negative direction of 3 mutually perpendicular mounting positions of the samples for a total of 18 shocks.

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Shock Machine	Avco SM-110-3	1022	N/A
Voltmeter	Hioki 3560	080732566	22-Sep-10
Scale	Acculab ATL-4202-1	24550089	15-Nov-10

Test Data:☒ Small Battery ☐ Large Battery

Sample	Charge State	Before Test		After Test		Mass Loss	Pass/Fail	Voltage Retention	Pass/Fail	Event	Test Comments/Verdict
		Mass	Voltage	Mass	Voltage						
		(g)	(V)	(g)	(V)	(%)	≤0.1%	(%)	≥90%		
1	1C	381.87	12.280	381.88	12.700	0.00%	Pass	103.42%	Pass		TEST PASSED
2	1C	381.72	12.278	381.77	12.700	-0.01%	Pass	103.44%	Pass		
3	1C	383.58	12.265	383.59	12.600	0.00%	Pass	102.73%	Pass		
4	1C	381.60	12.240	381.62	12.230	-0.01%	Pass	99.92%	Pass		
5	50C	379.90	12.310	379.98	12.294	-0.02%	Pass	99.87%	Pass		
6	50C	380.61	12.333	380.65	12.312	-0.01%	Pass	99.83%	Pass		
7	50C	382.04	12.317	382.06	12.322	-0.01%	Pass	100.04%	Pass		
8	50C	378.82	12.360	378.80	12.336	0.01%	Pass	99.81%	Pass		
9	1D	378.65	10.265	378.67	10.052	-0.01%	Pass	n/a	n/a		
10	1D	380.86	10.480	380.90	10.322	-0.01%	Pass	n/a	n/a		
11	1D	378.86	10.610	378.89	10.496	-0.01%	Pass	n/a	n/a		
12	1D	377.15	10.145	377.20	10.033	-0.01%	Pass	n/a	n/a		
13	50D	382.42	10.820	382.48	10.724	-0.02%	Pass	n/a	n/a		
14	50D	381.12	10.953	381.27	10.947	-0.04%	Pass	n/a	n/a		
15	50D	381.12	10.530	381.18	10.537	-0.02%	Pass	n/a	n/a		
16	50D	381.05	10.365	381.11	10.287	-0.02%	Pass	n/a	n/a		

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	No leakage or mass loss > 0.1%; voltage retention > 90%	Pass
1	Leakage or mass loss > 0.1%	Fail
2	Voltage retention < 90%	Fail
3	Cell/battery vents as designed without rupture or disassembly	Fail
4	Cell/battery ruptures without ejection of solid material	Fail
5	Cell/battery ruptures with ejection of solid material	Fail
6	Cell/battery ruptures with flame or spark	Fail



TEST 5: External Short Circuit (Section 38.3.4.5)

Test Report Number: **UN10-0007**

Performed By: **A. Esteban**

Test Start Date: **26-Mar-10**

Test Finish Date: **26-Mar-10**

Purpose:

This test simulates an external short circuit.

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Thermometer	Arbin BT-2043	150267	10-Aug-10
Temperature Chamber	Thermal Shock Chamber TSV-40S	640097	N/A

Test Procedure:

After the samples' external cases are temperature stabilized at $55\pm 2^{\circ}\text{C}$, the samples are to be subjected to a short circuit condition with a total external resistance of less than 0.1Ω at $55\pm 2^{\circ}\text{C}$. This short circuit condition is continued for at least 1 hour after the cell or battery external case temperature has returned to $55\pm 2^{\circ}\text{C}$. The batteries must be observed for a further 6 hours before stopping the step.

Test Data:

Sample	Charge State	Did case temperature exceed 170°C ?	Any disassembly or fire within 6 hours?	Event	Pass/Fail	Test Comments/Verdict
		Yes/No	Yes/No			
1	1C	No	No	0	Pass	TEST PASSED
2	1C	No	No	0	Pass	
3	1C	No	No	0	Pass	
4	1C	No	No	0	Pass	
5	50C	No	No	0	Pass	
6	50C	No	No	0	Pass	
7	50C	No	No	0	Pass	
8	50C	No	No	0	Pass	
9	1D	No	No	0	Pass	
10	1D	No	No	0	Pass	
11	1D	No	No	0	Pass	
12	1D	No	No	0	Pass	
13	50D	No	No	0	Pass	
14	50D	No	No	0	Pass	
15	50D	No	No	0	Pass	
16	50D	No	No	0	Pass	

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	Battery temperature does not exceed 170°C	Pass
1	Battery temperature exceed 170°C	Fail
3	Battery vents as designed without rupture or disassembly	Fail
4	Battery ruptures without ejection of solid material	Fail
5	Battery ruptures with ejection of solid material	Fail
6	Battery ruptures or vents with flame or spark	Fail



TEST 6 (Cell Level Only): Impact (Section 38.3.4.6)

Test Report Number: **UN10-0007**

Performed By:

Test Start Date:

Test Finish Date:

Purpose:

This test simulates an impact.

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Thermometer	Arbin BT-2043	150267	N/A
15.8mm bar			
9.1kg mass			

Test Procedure:

Cell sample is to be placed on a flat surface. A 15.8mm-diameter bar is placed across the center of the sample. A mass of 9.1kg is dropped from a height of 61 ± 2.5 cm onto the sample. A cylindrical or prismatic cell is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8mm-diameter curve surface lying across the center of the test sample. A prismatic cell is also to be rotated 90° around its longitudinal axis so that both the wide and narrow sides will be subjected to the impact. Each sample is subjected to a single impact. Separate samples are to be used for each impact. A coin or button cell is to be impacted with the flat surface of the sample parallel to the and the 15.8mm-diameter curve surface lying across its center.

Test Data:

Sample	Charge State	Did external temperature exceed 170°C ?	Any disassembly or fire within 6 hours?	Event	Pass/Fail	Test Comments/Verdict
		Yes/No	Yes/No			
1	0.5D			omitted	omitted	Test OMITTED / Cell is already UN 38.3 certified; see attached report.
2	0.5D			omitted	omitted	
3	0.5D			omitted	omitted	
4	0.5D			omitted	omitted	
5	0.5D			omitted	omitted	
6	50D			omitted	omitted	
7	50D			omitted	omitted	
8	50D			omitted	omitted	
9	50D			omitted	omitted	
10	50D			omitted	omitted	

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	Battery temperature does not exceed 170°C	Pass
1	Battery temperature exceed 170°C	Fail
3	Battery vents as designed without rupture or disassembly	Fail
4	Battery ruptures without ejection of solid material	Fail
5	Battery ruptures with ejection of solid material	Fail
6	Battery ruptures or vents with flame or spark	Fail



TEST 7: Overcharge (Section 38.3.4.7)

Test Report Number: **UN10-0007**

Performed By: **A. Esteban**

Test Start Date: **29-Mar-10**

Test Finish Date: **06-Apr-10**

Purpose:

This test evaluates the ability of a rechargeable battery to withstand an overcharge condition.

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Power Supply	BK Precision	5221001320	22-Sep-10
Power Supply	BK Precision	5221241421	22-Sep-10
Power Supply	Kikusui PAL 35-10	16013589	03-Aug-10
Power Supply	Power/Mate	0341-5	01-Oct-10

Test Procedure:

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

(a) when the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of 2 times the maximum charge voltage of the battery or 22V.

(b) when the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.

Tests are to be conducted at ambient temperature. The duration of the charging test shall be 24 hours. The batteries are observed for another 7 days.

Test Data:

Sample	Charge State	Recom. Charge Current	Recom. Charge Voltage	Testing Charge Current	Testing Charge Voltage	Any dissassembly or fire within 7 days following test?	Event	Pass/Fail	Test Comments/Verdict
		(mA)	(V)	(mA)	(V)	Yes/No			
1	1C	2600	12.60	5200	22.00	No	0	Pass	TEST PASSED
2	1C					No	0	Pass	
3	1C					No	0	Pass	
4	1C					No	0	Pass	
5	50C					No	0	Pass	
6	50C					No	0	Pass	
7	50C					No	0	Pass	
8	50C					No	0	Pass	

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	Battery did not vent, rupture or disassemble	Pass
3	Battery vents as designed without rupture or disassembly	Fail
4	Battery ruptures without ejection of solid material	Fail
5	Battery ruptures with ejection of solid material	Fail
6	Battery ruptures or vents with flame or spark	Fail



TEST 8 (Cell Level Only): Forced Discharge (Section 38.3.4.8)

Test Report Number: **UN10-0007**

Performed By:

Test Start Date:

Test Finish Date:

Purpose:

This test evaluates the ability of a primary or rechargeable cell to withstand a forced discharge condition.

Test Equipment:

Equipment Type	Equipment Used	Serial Number	Current Calibration
Power Supply	Arbin BT-2043	150267	N/A
Ampmeter			

Test Procedure:

Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12Vdc power supply at an initial current equal to the maximum discharge current specified by the manufacturer. The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in amperes).

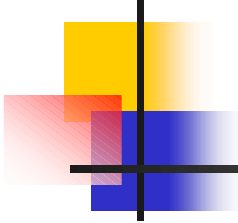
Test Data:

Sample	Charge State	Rated Capacity	Maximum Discharge Current	Testing Charge Current	Any dissassembly or fire within 7 days following test?	Event	Pass/Fail	Test Comments/Verdict
		(Ah)	(A)	(h)	Yes/No			
1	1D					omitted	omitted	Test OMITTED / Cell is already UN 38.3 certified; see attached report.
2	1D					omitted	omitted	
3	1D					omitted	omitted	
4	1D					omitted	omitted	
5	1D					omitted	omitted	
6	1D					omitted	omitted	
7	1D					omitted	omitted	
8	1D					omitted	omitted	
9	1D					omitted	omitted	
10	1D					omitted	omitted	
11	50D					omitted	omitted	
12	50D					omitted	omitted	
13	50D					omitted	omitted	
14	50D					omitted	omitted	
15	50D					omitted	omitted	
16	50D					omitted	omitted	
17	50D					omitted	omitted	
18	50D					omitted	omitted	
19	50D					omitted	omitted	
20	50D					omitted	omitted	

Code Reference Tables:

Code	Charge State
1C	After 1st cycle, fully charged state
50C	After 50 cycles, fully charged state
1D	After 1st cycle, fully discharged state
50D	After 50 cycles, fully discharged state
U	Undischarged state (fresh battery)
0.5C	1st cycle at 50% of the design rated capacity

Code	Event	T1
0	Battery did not vent, rupture or disassemble	Pass
3	Battery vents as designed without rupture or disassembly	Fail
4	Battery ruptures without ejection of solid material	Fail
5	Battery ruptures with ejection of solid material	Fail
6	Battery ruptures or vents with flame or spark	Fail



Test Report of UN Transportation

Model: ICR-18650J

In accordance with “AMENDMENTS TO THE THIRD REVISED EDITION OF THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS, MANUAL OF TESTS AND CRITERIA (Refer to ST/SG/AC.10/11/Rev.3) “

E-One Moli Energy Corp.

(Test Center Group)

Tainan Science-Based Industry Park

No.10 Dail 2nd Rd., Shan-Hwa, Tainan County, Taiwan R.O.C.

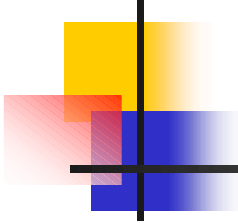
Tel: 886-6-505-0666

Fax: 886-6-505-0777

<http://www.e-one.com.tw>

Loc:\y:\qa\safety issues\un\





Certificate of Compliance

Issue Date: April 25, 2006

E-ONE MOLI ENERGY CORP.

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

The following products have been tested in accordance with the UN document titled 'AMENDMENTS TO THE THIRD REVISED EDITION OF THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS, MANUAL OF TESTS AND CRITERIA (Refer to ST/SG/AC.10/11/Rev.3)' and found to comply with the stated criteria:

<u>Item</u>	<u>Product Part No</u>	<u>Rated Capacity</u>
1	ICR-18650J	2.4Ah

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

Sincerely,



2006/04/25

Product Evaluation Engineer, QA

