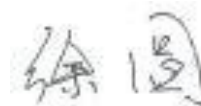


UN38.3 Test Summary

The following product has been evaluated according to the 6th revised edition Amendment 1 of the UN Manual of Tests and Criteria.
We, LG Chem, Ltd., hereby certify that this battery meets the requirements of the regulation for transportation of lithium-ion cells, batteries and single cell batteries.

Manufacture's contact information	LG Chem, Ltd. 128 Yeoui-Daero, Yeongdeungpo-gu, SEOUL, 150-721, REPUBLIC OF KOREA Telephone : +86-10-7742-5427 E-mail : kkammy@lgchem.com Website : www.lgchem.com		
Test Laboratory information	LG Chem, Ltd. / RESEARCH PARK 188 Munjiro, Yuseong-gu, Daejeon, 305-738, REPUBLIC OF KOREA Telephone : +82-10-3099-3724 E-mail : juhongpark@lgchem.com Website : www.lgchem.com		
	LG Chem (Nanjing) I&E Materials Co., Ltd NO.17 Hengyi Road, Nanjing Economic & Technological Development Zone, Nanjing, Jiangsu, China Telephone : +86-025-85603000-8288 E-mail : xuyuannj@lgchem.com Website : www.lgchem.com		
Description		List of Test Completed	
Test Report Number	QDI-190321-SB-EB-BA705ABU L	Test 1. Altitude Simulation	Pass
Date of test report	2019.03.21	Test 2. Thermal Test	Pass
Model name	EB-BA705ABU L	Test 3. Vibration	Pass
Type	Pouch (Lithium ion battery)	Test 4. Shock	Pass
Nominal voltage	3.85 V	Test 5. External Short Circuit	Pass
Capacity	17.33Wh	Test 6. Impact or Crush	Pass
Weight	61.703g	Test 7. Overcharge	Pass
Dimensions	64.33mmX83.9mmX4.85mm	Test 8. Forced Discharge	Pass

Approved By: Yuan Xu
 Part Leader
 Cyl NPI&CE lab part DQA Team
 LG Chem, Ltd.
 E-mail: xuyuannj@lgchem.com



Document Number	QDI-190321-SB-EB-BA705ABU L	
Prepared	qianjunli	钱俊丽
Approved	Xuyuan	徐园

UN38.3 Test Report

- EB-BA705ABU L (Nom. 17.33Wh, 3.85V) -

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- 1. UN38.3 Test Condition
- 2. Test Result
- 3. Sample Image

2019. 03. 21



1. UN38.3 Test Condition

Rev.6 Amendment 1

Test item	Test Condition	Requirements	Etc.
Test 1. Altitude Simulation	Storing at (low pressure) 11.6kPa for 6hr at 20+/-5°C	- After OCV (%) ≥ 90% - No leakage, no venting, no disassembly, no rupture, no fire - Mass loss limit (leakage) 1) If M < 1g, less than 0.5%, 2) If 1g ≤ M ≤ 75g, less than 0.2%, 3) If M > 75g, less than 0.1%	T1~T5 : Sequence Tests <pre> graph TD T1[Test 1 Altitude Simulation] --> T2[Test 2 Thermal Test] T2 --> T3[Test 3 Vibration] T3 --> T4[Test 4 Shock] T4 --> T5[Test 5 Ext. Short Circuit] </pre>
Test 2. Thermal Test	[72±2°C, 6hr ↔ -40±2°C, 6hr, interval max. 30min] x 10 cycle Storing at 20±5°C for 24h		
Test 3. Vibration	[7Hz ↔ 200Hz ↔ 7Hz, in 15min] x 12 times x 3 direction 1) sinusoidal waveform with a logarithmic sweep 2) 7Hz - 18Hz (maintaining 1gn) app. 50Hz (until 8gn) 200Hz (maintaining 8gn), 1.6mm total excursion		
Test 4. Shock	Half sine shock 1) Peak acceleration - For cells & single cell batteries : 150gn - For batteries (whichever is smaller): 150gn or 100gn 2) Pulse duration : 6m sec 3) 6 direction (±x, y, z) x 3 cycle		
Test 5. External Short Circuit	1) Samples to be heated to 57±4°C in chamber (Measured on external case) 2) Less than 0.1Ω, ext. short-circuit at 57±4°C 3) 1hr continue after returning to 57±4°C		
Test 6. Impact	Φ=15.8±0.1mm bar, 9.1±0.1kg mass, 61±2.5cm height	- No disassembly, no fire within 6 hours after the test - Max. Temp ≤ 170°C	for cylindrical cells (not less than 18mm diameter)
Test 6. Crush	Crushing rate : 1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation		for cylindrical cells (less than 18mm diameter) for prismatic, pouch, coin/button cells
Test 7. Overcharge	Current = Manufacturer's recommended max. continuous charge current X 2 Voltage 1. If charge voltage ≤ 18V, V (min.) = 2 x (max. charge voltage) or 22V. 2. If charge voltage > 18V, V (min.) = 1.2 x (max. charge voltage)	- No disassembly, no fire within 7 days after the test	Only for Single Cell Battery / Battery
Test 8. Forced Discharge	Discharge at max. discharge current (connecting in series with 12V DC power supply), Duration time = rated capacity / initial test current	- No disassembly, no fire within 7 days after the test	Resistance of Electric Loader 1/Ω = (max. discharge current) / (12 + Initial OCV)

2-1. T1-T4 Test Result

Before			Altitude (T1)					Thermal (T2)					Vibration (T3)					Shock (T4)				
NO.	OCV	Mass (g)	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result	After OCV (V)	Mass (g)	After OCV(%)	Mass Loss(%)	Result

A. 1st cycle fully charged state

1	4.3246	61.046	4.3237	61.045	99.98	0.002	Pass	4.2562	61.039	98.44	0.010	Pass	4.2560	61.039	100.00	0.000	Pass	4.2561	61.040	100.00	0.000	Pass
2	4.3238	61.285	4.3230	61.284	99.98	0.002	Pass	4.2560	61.278	98.45	0.010	Pass	4.2558	61.280	100.00	0.000	Pass	4.2560	61.280	100.00	0.000	Pass
3	4.3242	61.703	4.3231	61.702	99.97	0.002	Pass	4.2506	61.699	98.32	0.005	Pass	4.2505	61.697	100.00	0.003	Pass	4.2507	61.699	100.00	0.000	Pass
4	4.3250	61.403	4.3239	61.403	99.97	0.000	Pass	4.2512	61.398	98.32	0.008	Pass	4.2511	61.398	100.00	0.000	Pass	4.2513	61.400	100.00	0.000	Pass
5	4.3245	61.672	4.3234	61.670	99.97	0.003	Pass	4.2514	61.663	98.33	0.011	Pass	4.2514	61.663	100.00	0.000	Pass	4.2515	61.665	100.00	0.000	Pass

B. 25th cycle fully charged state

6	4.3404	61.511	4.3380	61.512	99.94	0.000	Pass	4.2656	61.507	98.33	0.008	Pass	4.2656	61.508	100.00	0.000	Pass	4.2657	61.509	100.00	0.000	Pass
7	4.3380	61.522	4.3361	61.518	99.96	0.007	Pass	4.2637	61.516	98.33	0.003	Pass	4.2637	61.516	100.00	0.000	Pass	4.2637	61.516	100.00	0.000	Pass
8	4.3389	61.623	4.3369	61.618	99.95	0.008	Pass	4.2647	61.616	98.34	0.003	Pass	4.2647	61.616	100.00	0.000	Pass	4.2647	61.617	100.00	0.000	Pass
9	4.3403	61.407	4.3379	61.404	99.94	0.005	Pass	4.2640	61.402	98.30	0.003	Pass	4.2640	61.400	100.00	0.003	Pass	4.2640	61.400	100.00	0.000	Pass
10	4.3392	61.658	4.3371	61.658	99.95	0.000	Pass	4.2638	61.655	98.31	0.005	Pass	4.2638	61.654	100.00	0.002	Pass	4.2638	61.655	100.00	0.000	Pass

2-2. T5/T7 Test Result

EXT.Short Circuit (T5)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
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A. 1st cycle fully charged state

1	4.2561	58.14	Pass
2	4.2560	58.37	Pass
3	4.2507	57.98	Pass
4	4.2513	57.86	Pass
5	4.2515	57.98	Pass

B. 25th cycle fully charged state

6	4.2657	58.06	Pass
7	4.2637	57.67	Pass
8	4.2647	57.46	Pass
9	4.2640	57.20	Pass
10	4.2638	56.45	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
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A. 1st cycle fully charged state

11	4.3180	23.61	Pass
12	4.3181	23.51	Pass
13	4.3182	23.41	Pass
14	4.3186	23.25	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
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B. 25th cycle fully charged state

15	4.3361	23.31	Pass
16	4.3303	23.01	Pass
17	4.3288	23.07	Pass
18	4.3299	22.80	Pass

2-3. T6/T8 Test Result (P486583A1)

Cell Document Number	QDI-190321-C-P486583A1
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Crush (T6)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle 50% charged state

C-1	3.8430	21.20	Pass
C-2	3.8430	20.39	Pass
C-3	3.8429	20.14	Pass
C-4	3.8435	21.04	Pass
C-5	3.8425	20.37	Pass

B. 25st cycle 50% charged state

C-6	3.8609	22.06	Pass
C-7	3.8602	20.46	Pass
C-8	3.8609	20.62	Pass
C-9	3.8628	20.20	Pass
C-10	3.8609	21.06	Pass

Forced Discharge (T8)							
NO.	Initial OCV(V)	Max. Temp (°C)	Result	NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully discharged state

C-6	3.4081	62.10	Pass
C-7	3.4033	59.66	Pass
C-8	3.2956	64.62	Pass
C-9	3.4042	61.28	Pass
C-10	3.4023	65.12	Pass
C-11	3.4035	62.91	Pass
C-12	3.4069	62.51	Pass
C-13	3.4050	57.88	Pass
C-14	3.4070	62.98	Pass
C-15	3.4051	58.70	Pass

B. 25th cycle fully discharged state

C-16	3.4439	65.43	Pass
C-17	3.4244	64.03	Pass
C-18	3.4215	66.21	Pass
C-19	3.4222	62.24	Pass
C-20	3.4295	65.29	Pass
C-21	3.4241	63.91	Pass
C-22	3.4252	67.10	Pass
C-23	3.4239	61.01	Pass
C-24	3.4151	65.11	Pass
C-25	3.4329	62.69	Pass

