CONFIDENTIAL

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-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-191025-SB-EB-BG985ABY L	Test 1. Altitude Simulation	Pass
Date of test report	2019.10.25	Test 2. Thermal Test	Pass
Model name	EB-BG985ABY L	Test 3. Vibration	Pass
Type	Pouch	Test 4. Shock	Pass
Nominal voltage	3.86 V	Test 5. External Short Circuit	Pass
Capacity	17.37Wh	Test 6. Impact or Crush	Pass
Weight	60.957g	Test 7. Overcharge	Pass
Dimensions	77.05mmX63.03mmX5.2mm	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-191025-SB-EB-BG985ABY L	
Prepared	qianjunli	
Approved	Xuyuan	

CONFIDENTIAL

UN38.3 Test Report
- EB-BG985ABY L (Nom. 17.37Wh, 3.86V) -

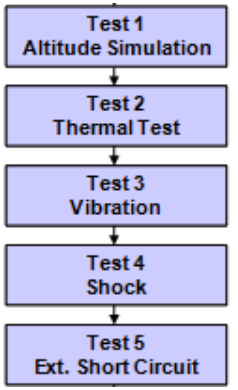
Index

2019. 10. 25

LG Chem

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℃	- 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 
Test 2. Thermal Test	[72±2℃,6hr ↔ -40±2℃,6hr, interval max. 30min] x 10cycle Storing at 20±5℃ 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 $\sqrt{\frac{100850}{Mass(kg)}}$ gn 2) Pulse duration : 6msec 3) 6 direction (±x, y, z) x 3 cycle		
Test 5. External Short Circuit	1) Samples to be heated to 57±4℃ in chamber (Measured on external case) 2) Less than 0.1Ω, ext. short-circuit at 57±4℃ 3) 1hr continue after returning to 57±4℃	- No disassembly, no rupture, no fire within 6 hours after the test - Max. Temp ≤ 170℃	
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℃	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	4.3591	60.643	4.3578	60.644	99.97	0.000	Pass	4.2736	60.635	98.07	0.015	Pass	4.2732	60.634	99.99	0.002	Pass	4.2732	60.635	100.00	0.000	Pass
2	4.3547	60.630	4.3537	60.628	99.98	0.003	Pass	4.2709	60.621	98.10	0.012	Pass	4.2705	60.620	99.99	0.002	Pass	4.2706	60.621	100.00	0.000	Pass
3	4.3574	60.865	4.3563	60.865	99.97	0.000	Pass	4.2723	60.859	98.07	0.010	Pass	4.2718	60.858	99.99	0.002	Pass	4.2720	60.860	100.00	0.000	Pass
4	4.3580	60.804	4.3568	60.805	99.97	0.000	Pass	4.2718	60.796	98.05	0.015	Pass	4.2713	60.796	99.99	0.000	Pass	4.2715	60.797	100.00	0.000	Pass
5	4.3533	60.957	4.3523	60.956	99.98	0.002	Pass	4.2690	60.949	98.09	0.011	Pass	4.2686	60.949	99.99	0.000	Pass	4.2688	60.951	100.00	0.000	Pass
B. 25th cycle fully charged state																						
6	4.3609	60.659	4.3602	60.658	99.98	0.002	Pass	4.2822	60.649	98.21	0.015	Pass	4.2818	60.650	99.99	0.000	Pass	4.2819	60.652	100.00	0.000	Pass
7	4.3650	60.693	4.3642	60.692	99.98	0.002	Pass	4.2858	60.683	98.20	0.015	Pass	4.2853	60.683	99.99	0.000	Pass	4.2852	60.686	100.00	0.000	Pass
8	4.3648	60.761	4.3640	60.760	99.98	0.002	Pass	4.2850	60.752	98.19	0.013	Pass	4.2846	60.752	99.99	0.000	Pass	4.2847	60.753	100.00	0.000	Pass
9	4.3649	60.887	4.3640	60.887	99.98	0.000	Pass	4.2849	60.879	98.19	0.013	Pass	4.2845	60.877	99.99	0.003	Pass	4.2845	60.880	100.00	0.000	Pass
10	4.3597	60.805	4.3588	60.805	99.98	0.000	Pass	4.2814	60.797	98.22	0.013	Pass	4.2810	60.796	99.99	0.002	Pass	4.2810	60.798	100.00	0.000	Pass

2-2. T5/T7 Test Result

EXT.Short Circuit (T5)

A. 1st cycle fully charged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result
1	4.2732	58.40	Pass
2	4.2706	58.32	Pass
3	4.2720	57.65	Pass
4	4.2715	57.33	Pass
5	4.2688	57.47	Pass

B. 25th cycle fully charged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result
6	4.2819	58.38	Pass
7	4.2852	58.32	Pass
8	4.2847	57.64	Pass
9	4.2845	57.41	Pass
10	4.2810	56.75	Pass

Over Charge (T7)

A. 1st cycle fully charged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result
11	4.3578	24.50	Pass
12	4.3583	24.30	Pass
13	4.3518	24.40	Pass
14	4.3454	24.60	Pass

Over Charge (T7)

B. 25th cycle fully charged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result
15	4.3520	24.40	Pass
16	4.3668	24.50	Pass
17	4.3673	24.50	Pass
18	4.3648	24.30	Pass

2-3. T6/T8 Test Result (P526376A1)

Cell Document Number	QDI-191024-C-P526376A1

Crush (T6)

A. 1st cycle 50% charged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result
C-1	3.8609	25.78	Pass
C-2	3.8610	24.93	Pass
C-3	3.8612	22.72	Pass
C-4	3.8625	22.85	Pass
C-5	3.8594	25.46	Pass

B. 25st cycle 50% charged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result
C-6	3.8811	25.13	Pass
C-7	3.8826	25.48	Pass
C-8	3.8826	22.94	Pass
C-9	3.8855	27.18	Pass
C-10	3.8828	26.68	Pass

Forced Discharge (T8)

A. 1st cycle fully discharged state / B. 25th cycle fully discharged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result	NO.	Initial OCV(V)	Max. Temp (℃)	Result
C-6	3.4995	63.70	Pass	C-16	3.4573	65.92	Pass
C-7	3.4998	60.47	Pass	C-17	3.4640	66.24	Pass
C-8	3.5044	65.30	Pass	C-18	3.4670	67.46	Pass
C-9	3.5063	60.64	Pass	C-19	3.4648	67.65	Pass
C-10	3.5009	63.27	Pass	C-20	3.4656	68.04	Pass
C-11	3.5016	61.43	Pass	C-21	3.4626	70.34	Pass
C-12	3.5014	63.05	Pass	C-22	3.4668	68.26	Pass
C-13	3.4930	64.63	Pass	C-23	3.4682	60.86	Pass
C-14	3.4984	63.03	Pass	C-24	3.4612	60.65	Pass
C-15	3.5002	62.66	Pass	C-25	3.4642	69.29	Pass

3. Sample Image