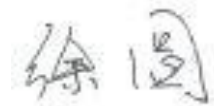


UN38.3 Test Summary

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-191113-B-L19L6P71	Test 1. Altitude Simulation	Pass
Date of test report	2019.11.13	Test 2. Thermal Test	Pass
Model name	L19L6P71	Test 3. Vibration	Pass
Type	Pouch	Test 4. Shock	Pass
Nominal voltage	11.55 V	Test 5. External Short Circuit	Pass
Capacity	94.00Wh	Test 6. Impact or Crush	Pass
Weight	369.09g	Test 7. Overcharge	Pass
Dimensions	310.2mmX64.1mmX11.0mm	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-191113-B-L19L6P71	
Prepared	qianjunli	钱俊丽
Approved	Xuyuan	徐园

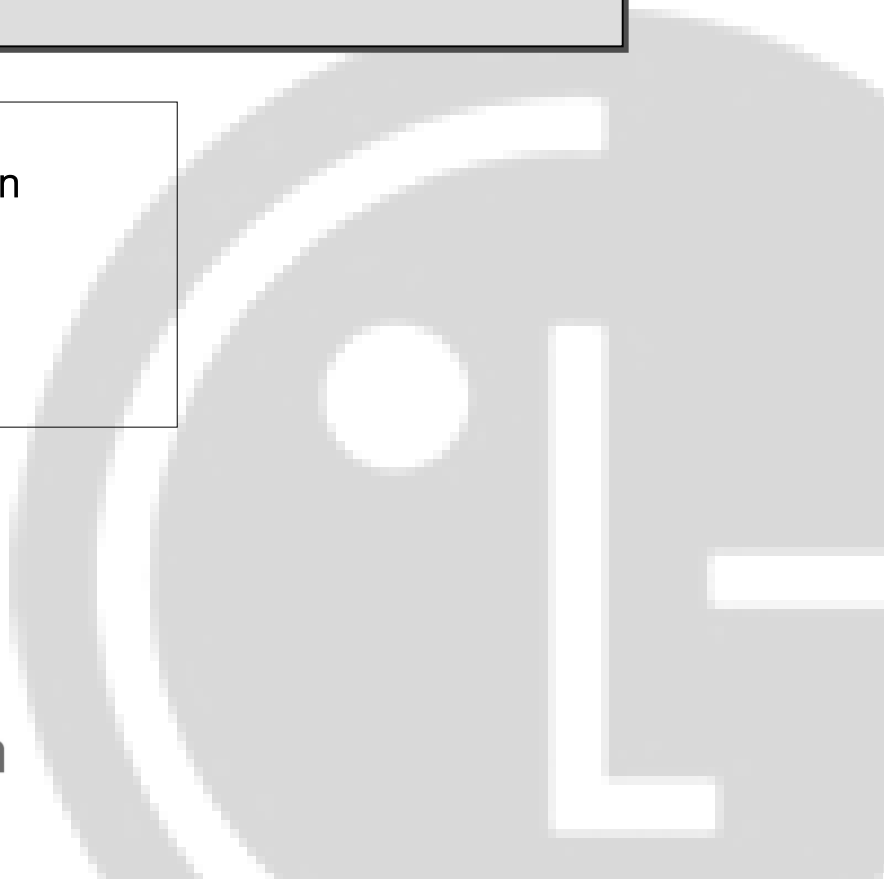
UN38.3 Test Report

- L19L6P71 (Nom. 94.00Wh, 11.55V) -

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2019. 11. 13



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		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 10cycle 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	- 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%)	
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°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	- No disassembly, no rupture, no fire within 6 hours after the test - Max. Temp ≤ 170°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	13.0304	368.45	12.6341	368.46	96.96	0.000	Pass	12.7605	368.39	100.00	0.019	Pass	12.7602	368.39	100.00	0.000	Pass	12.7678	368.38	100.00	0.003	Pass
2	13.0243	368.39	12.6259	368.39	96.94	0.000	Pass	12.7520	368.31	100.00	0.022	Pass	12.7517	368.31	100.00	0.000	Pass	12.7588	368.31	100.00	0.000	Pass
3	13.0100	368.44	12.6094	368.44	96.92	0.000	Pass	12.7491	368.37	100.00	0.019	Pass	12.7480	368.36	99.99	0.003	Pass	12.7550	368.36	100.00	0.000	Pass
4	13.0120	369.09	12.6092	369.08	96.90	0.003	Pass	12.7498	369.00	100.00	0.022	Pass	12.7475	369.01	99.98	0.000	Pass	12.7555	368.99	100.00	0.005	Pass

B. 25th cycle fully charged state

5	13.0625	367.69	12.6632	367.70	96.94	0.000	Pass	12.7822	367.63	100.00	0.019	Pass	12.7430	367.63	99.69	0.000	Pass	12.7493	367.63	100.00	0.000	Pass
6	13.0650	366.99	12.6672	366.99	96.96	0.000	Pass	12.7913	366.93	100.00	0.016	Pass	12.7512	366.93	99.69	0.000	Pass	12.7582	366.92	100.00	0.003	Pass
7	13.0568	367.90	12.6583	367.89	96.95	0.003	Pass	12.7870	367.83	100.00	0.016	Pass	12.7466	367.83	99.68	0.000	Pass	12.7536	367.83	100.00	0.000	Pass
8	13.0470	368.68	12.6505	368.68	96.96	0.000	Pass	12.7811	368.61	100.00	0.019	Pass	12.7443	368.62	99.71	0.000	Pass	12.7511	368.61	100.00	0.003	Pass

2-2. T5/T7 Test Result

EXT.Short Circuit (T5)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully charged state

1	12.7678	58.69	Pass
2	12.7588	58.69	Pass
3	12.7550	57.75	Pass
4	12.7555	57.77	Pass

B. 25th cycle fully charged state

5	12.7493	58.61	Pass
6	12.7582	58.49	Pass
7	12.7536	57.85	Pass
8	12.7511	57.78	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully charged state

9	12.6408	23.71	Pass
10	13.0168	23.35	Pass
11	12.6308	23.61	Pass
12	13.0235	23.31	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

B. 25th cycle fully charged state

13	12.6373	23.47	Pass
14	12.6428	23.11	Pass
15	12.6580	23.27	Pass
16	13.0637	23.04	Pass

2-3. T6/T8 Test Result (P485490B1)

Cell Document Number	QDI-190427-C-P485490B1
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Crush (T6)			
NO. 3.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle 50% charged state

11	3.8451	21.69	Pass
12	3.8429	22.12	Pass
13	3.8433	21.72	Pass
14	3.8446	20.67	Pass
15	3.8436	21.85	Pass

B. 25th cycle 50% charged state

16	3.8682	21.60	Pass
17	3.8687	22.18	Pass
18	3.8651	22.17	Pass
19	3.8639	22.45	Pass
20	3.8659	22.68	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				B. 25th cycle fully discharged state			
21	3.4392	84.08	Pass	31	3.5052	75.99	Pass
22	3.4352	83.85	Pass	32	3.5110	85.09	Pass
23	3.4382	84.20	Pass	33	3.5159	77.14	Pass
24	3.4365	83.33	Pass	34	3.5036	89.94	Pass
25	3.4358	82.47	Pass	35	3.5092	78.10	Pass
26	3.4383	70.79	Pass	36	3.5210	81.13	Pass
27	3.4369	84.90	Pass	37	3.5134	78.04	Pass
28	3.4352	78.15	Pass	38	3.5096	86.53	Pass
29	3.4365	85.90	Pass	39	3.5110	80.34	Pass
30	3.4382	83.00	Pass	40	3.5151	82.91	Pass

3. Sample Image

