

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.

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Description		List of Test Completed	
Test Report Number	QDI-190607-B-L19L3PD3	Test 1. Altitude Simulation	Pass
Date of test report	2019.06.07	Test 2. Thermal Test	Pass
Model name	L19L3PD3	Test 3. Vibration	Pass
Type	Pouch	Test 4. Shock	Pass
Nominal voltage	11.55 V	Test 5. External Short Circuit	Pass
Capacity	56.00Wh	Test 6. Impact or Crush	Pass
Weight	223.91g	Test 7. Overcharge	Pass
Dimensions	216.90mmX95.80mmX6.8mm	Test 8. Forced Discharge	Pass

Approved By: Yuan Xu
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Document Number	QDI-190607-B-L19L3PD3	
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UN38.3 Test Report

– L19L3PD3 (Nom. 56.00Wh, 11.55V) –

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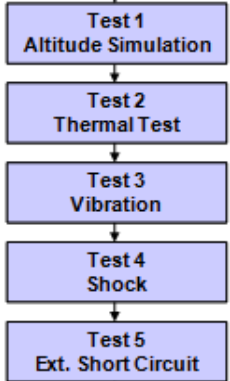
1. UN38.3 Test Condition
2. Test Result
3. Sample Image

2019. 06. 07



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 
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 $\sqrt{\frac{100850}{\text{Mass(kg)}}}$ 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	12.2823	223.43	12.2816	223.41	99.99	0.009	Pass	12.1478	223.40	98.91	0.004	Pass	12.1493	223.41	100.00	0.000	Pass	12.1430	223.41	99.95	0.000	Pass
2	12.2953	223.35	12.2938	223.34	99.99	0.004	Pass	12.1533	223.33	98.86	0.004	Pass	12.1570	223.33	100.00	0.000	Pass	12.1525	223.34	99.96	0.000	Pass
3	12.3109	223.66	12.3084	223.64	99.98	0.009	Pass	12.1688	223.64	98.87	0.000	Pass	12.1731	223.64	100.00	0.000	Pass	12.1680	223.64	99.96	0.000	Pass
4	12.3040	223.11	12.3010	223.10	99.98	0.004	Pass	12.1628	223.10	98.88	0.000	Pass	12.1662	223.09	100.00	0.004	Pass	12.1618	223.09	99.96	0.000	Pass

B. 25th cycle fully charged state

5	12.3190	223.66	12.3171	223.63	99.98	0.013	Pass	12.1752	223.63	98.85	0.000	Pass	12.1788	223.64	100.00	0.000	Pass	12.1754	223.63	99.97	0.004	Pass
6	12.3200	223.29	12.3150	223.28	99.96	0.004	Pass	12.1720	223.27	98.84	0.004	Pass	12.1732	223.28	100.00	0.000	Pass	12.1714	223.28	99.99	0.000	Pass
7	12.3273	223.40	12.3256	223.39	99.99	0.004	Pass	12.1825	223.39	98.84	0.000	Pass	12.1862	223.39	100.00	0.000	Pass	12.1810	223.39	99.96	0.000	Pass
8	12.3407	223.91	12.3386	223.91	99.98	0.000	Pass	12.1932	223.90	98.82	0.004	Pass	12.1965	223.91	100.00	0.000	Pass	12.1921	223.90	99.96	0.004	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	12.1430	57.48	Pass
2	12.1525	59.79	Pass
3	12.1680	56.31	Pass
4	12.1618	57.80	Pass

B. 25th cycle fully charged state

5	12.1754	57.11	Pass
6	12.1714	58.66	Pass
7	12.1810	55.52	Pass
8	12.1921	56.68	Pass

Over Charge (T7)

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

9	12.3087	24.42	Pass
10	12.2934	24.86	Pass
11	12.3055	24.21	Pass
12	12.2958	23.91	Pass

Over Charge (T7)

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

13	12.3162	24.08	Pass
14	12.3288	23.61	Pass
15	12.3002	23.87	Pass
16	12.3087	23.65	Pass

2-3. T6/T8 Test Result (P595490E1)

Cell Document Number

QDI-190523-C-P595490E1

Crush (T6)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
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A. 1st cycle 50% charged state

11	3.8446	20.22	Pass
12	3.8446	21.44	Pass
13	3.8441	20.63	Pass
14	3.8438	20.82	Pass
15	3.8434	21.34	Pass

B. 25th cycle 50% charged state

16	3.8526	21.11	Pass
17	3.8533	21.25	Pass
18	3.8529	21.43	Pass
19	3.8530	21.40	Pass
20	3.8502	21.38	Pass

Forced Discharge (T8)

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

21	3.4360	77.16	Pass	31	3.4474	78.20	Pass
22	3.4318	78.62	Pass	32	3.4349	74.99	Pass
23	3.4379	79.36	Pass	33	3.4367	75.95	Pass
24	3.4358	81.00	Pass	34	3.4364	76.59	Pass
25	3.4340	83.50	Pass	35	3.4458	79.39	Pass
26	3.4362	79.35	Pass	36	3.4419	76.88	Pass
27	3.4392	78.72	Pass	37	3.4395	76.78	Pass
28	3.4389	77.61	Pass	38	3.4482	78.44	Pass
29	3.4380	76.63	Pass	39	3.4362	78.62	Pass
30	3.4359	72.98	Pass	40	3.4662	77.42	Pass

B. 25th cycle fully discharged state

