

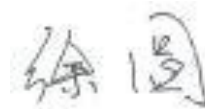
UN38.3 Test Summary

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-190420-B-L19L4PD2	Test 1. Altitude Simulation	Pass
Date of test report	2019.04.20	Test 2. Thermal Test	Pass
Model name	L19L4PD2	Test 3. Vibration	Pass
Type	Pouch	Test 4. Shock	Pass
Nominal voltage	15.40 V	Test 5. External Short Circuit	Pass
Capacity	62.00Wh	Test 6. Impact or Crush	Pass
Weight	247.00g	Test 7. Overcharge	Pass
Dimensions	288.70mmX112.20mmX5.8mm	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-190420-B-L19L4PD2	
Prepared	qianjunli	钱俊丽
Approved	Xuyuan	徐园

CONFIDENTIAL

UN38.3 Test Report

- L19L4PD2 (Nom. 62.00Wh, 15.40V) -

Index

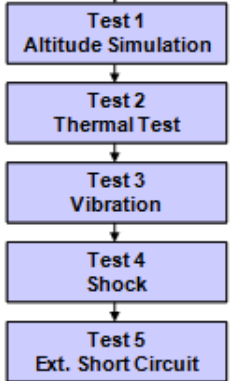
1. UN38.3 Test Condition
2. Test Result
3. Sample Image

2019. 04. 20



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℃		
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	16.9168	246.81	16.9114	246.78	99.97	0.012	Pass	16.5488	246.75	97.86	0.012	Pass	16.5488	246.75	100.00	0.000	Pass	16.5435	246.76	99.97	0.000	Pass
2	16.9225	246.91	16.9182	246.89	99.97	0.008	Pass	16.5572	246.86	97.87	0.012	Pass	16.5563	246.86	99.99	0.000	Pass	16.5512	246.87	99.97	0.000	Pass
3	16.8396	246.96	16.8353	246.95	99.97	0.004	Pass	16.5243	246.91	98.15	0.016	Pass	16.5235	246.92	100.00	0.000	Pass	16.5174	246.92	99.96	0.000	Pass
4	16.9202	247.00	16.9118	246.99	99.95	0.004	Pass	16.5558	246.95	97.89	0.016	Pass	16.5566	246.95	100.00	0.000	Pass	16.5507	246.96	99.96	0.000	Pass

B. 25th cycle fully charged state

5	16.9535	246.78	16.9488	246.77	99.97	0.004	Pass	16.5901	246.74	97.88	0.012	Pass	16.5904	246.74	100.00	0.000	Pass	16.5848	246.75	99.97	0.000	Pass
6	16.9341	246.68	16.9301	246.66	99.98	0.008	Pass	16.5843	246.64	97.96	0.008	Pass	16.5842	246.63	100.00	0.004	Pass	16.5785	246.64	99.97	0.000	Pass
7	16.9585	246.79	16.9530	246.76	99.97	0.012	Pass	16.5918	246.74	97.87	0.008	Pass	16.5911	246.74	100.00	0.000	Pass	16.5860	246.75	99.97	0.000	Pass
8	16.9560	247.08	16.9515	247.07	99.97	0.004	Pass	16.5953	247.04	97.90	0.012	Pass	16.5960	247.04	100.00	0.000	Pass	16.5907	247.05	99.97	0.000	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	16.5435	58.67	Pass
2	16.5512	58.45	Pass
3	16.5174	57.14	Pass
4	16.5507	57.95	Pass

B. 25th cycle fully charged state

5	16.5848	59.16	Pass
6	16.5785	56.67	Pass
7	16.5860	57.71	Pass
8	16.5907	57.52	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
-----	----------------	----------------	--------

A. 1st cycle fully charged state

9	16.8228	23.21	Pass
10	16.9073	22.90	Pass
11	16.9155	23.01	Pass
12	16.9164	22.44	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
-----	----------------	----------------	--------

B. 25th cycle fully charged state

13	16.9550	22.80	Pass
14	16.9420	22.30	Pass
15	16.9400	22.66	Pass
16	16.8558	22.20	Pass

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

Cell Document Number

QDI-190420-C-P485490B1

Crush (T6)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
-----	-------------------	-------------------	--------

A. 1st cycle 50% charged state

C-1	3.8451	21.69	Pass
C-2	3.8429	22.12	Pass
C-3	3.8433	21.72	Pass
C-4	3.8446	20.67	Pass
C-5	3.8436	21.85	Pass

B. 25st cycle 50% charged state

C-6	3.8682	21.60	Pass
C-7	3.8687	22.18	Pass
C-8	3.8651	22.17	Pass
C-9	3.8639	22.45	Pass
C-10	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

C-6	3.4392	84.08	Pass	C-16	3.5052	75.99	Pass
C-7	3.4352	83.85	Pass	C-17	3.5110	85.09	Pass
C-8	3.4382	84.20	Pass	C-18	3.5159	77.14	Pass
C-9	3.4365	83.33	Pass	C-19	3.5036	89.94	Pass
C-10	3.4358	82.47	Pass	C-20	3.5092	78.10	Pass
C-11	3.4383	70.79	Pass	C-21	3.5210	81.13	Pass
C-12	3.4369	84.90	Pass	C-22	3.5134	78.04	Pass
C-13	3.4352	78.15	Pass	C-23	3.5096	86.53	Pass
C-14	3.4365	85.90	Pass	C-24	3.5110	80.34	Pass
C-15	3.4382	83.00	Pass	C-25	3.5151	82.91	Pass

B. 25th cycle fully discharged state

3. Sample Image

