



UN38.3 试验概要

UN38.3 Test Summary

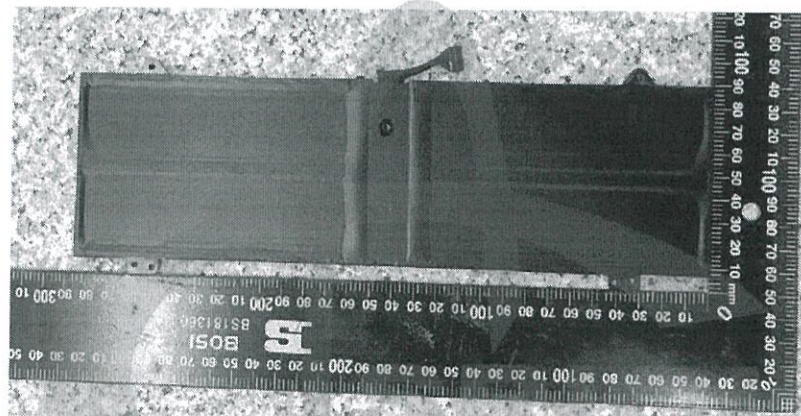
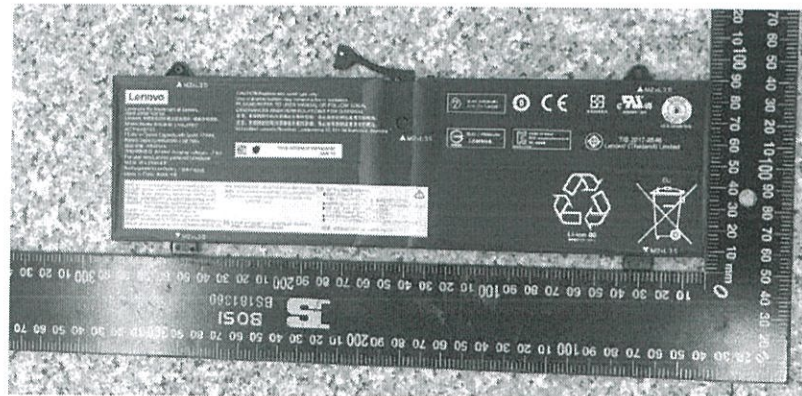


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单位信息 Company information			
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电池信息 Battery information			
名称 Name	锂离子电池	品牌 Brand	/
型号 Type	L19L4PDC	原始测试型号 Original tested type	/
标称电压(V) Nominal voltage	15.4	容量/能量 Capacity/energy	(Typ)4615mAh 71 Wh/(Rated)4462mAh 68.7Wh
描述 Description	可充电锂离子电池组 Rechargeable Li-ion battery	锂含量(g) Li content	/
质量(kg) Mass	0.280	外观 Appearance	黑色塑胶及塑料薄膜外壳 Black plastics cement and plastics film shell
测试信息 Test information			
原报告编号 Original test report No.	QDI-200318-B-L19L4PDC	测试报告日期 Date of test report	2020-03-18
测试标准 Test standard	联合国《关于危险货物运输的建议书 试验和标准手册》第 38.3 章 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria 38.3 ST/SG/AC.10/11/Rev.6/Amend.1		
T.1 高度模拟 Altitude simulation	合格 Passed	T.2 温度测试 Thermal test	合格 Passed
T.3 振动测试 Vibration	合格 Passed	T.4 冲击测试 Shock	合格 Passed
T.5 外部短路 External short circuit	合格 Passed	T.6 挤压 Crush	合格 Passed
T.7 过度充电 Overcharge	合格 Passed	T.8 强制放电 Forced discharge	合格 Passed
38.3.3 (f)	/	38.3.3 (g)	/



样品图片 Sample Picture



结论 Conclusion	测试样品符合联合国《关于危险货物运输的建议书试验和标准手册》ST/SG/AC.10/11/Rev.6/Amend.1 38.3 标准要求。The tested samples meet the requirements of test items of the UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11/Rev.6/Amend.1 38.3		
备注 Remark	/		
签名 Signature 职务 Title	王寅 副总工程师 Vice chief engineer	签发日期 Issued date	2020-03-23

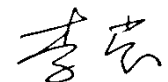
-验证码:732371-

报告结束

UN38.3 Test Summary

Manufacture's contact information	LG Chem, Ltd. 128 Yeoui-Daero, Yeongdeungpo-gu, SEOUL, 150-721, REPUBLIC OF KOREA Telephone : +82-10-7742-5427 E-mail : kkammy@lgchem.com Website : www.lgchem.com		
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	LG Chem (Nanjing) I&E Materials Co., Ltd NO.17 Hengyi Road, Nanjing Economic & Technological Development Zone, Nanjing, Jiangsu, China Telephone : +86-025-85603000-8231 E-mail : njliying@lgchem.com Website : www.lgchem.com		
Description		List of Test Completed	
Cell/Battery Type (Physical Description)	Lithium Ion battery pack (Pouch)	Revised edition	Revision 6 Amendment 1
Test Report Number	QDI-200318-B-L19L4PDC	Test 1. Altitude Simulation	Pass
Date of test report	2020.03.18	Test 2. Thermal Test	Pass
Model name	L19L4PDC	Test 3. Vibration	Pass
Nominal voltage (V)	15.40	Test 4. Shock	Pass
Capacity (Nominal Wh)	71.00	Test 5. External Short Circuit	Pass
Weight (g)	279.12	Test 6. Impact or Crush	Pass
Dimensions (mm)	285.15X83.15X5.80	Test 7. Overcharge	Pass
Reference to assembled battery testing requirements	Not applicable	Test 8. Forced Discharge	Pass

Approved By: Ying Li
 Team Leader
 Cyl NPI&CE lab part DQA Team
 LG Chem, Ltd.
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Document Number	QDI-200318-B-L19L4PDC	
Prepared	Jie Ma	
Approved	Ying Li	

UN38.3 Test Report

– L19L4PDC (Nom. 71.00Wh, 15.40V) –

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3. Sample Image

2020. 03. 18

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 <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℃,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	17.0845	278.36	17.0806	278.36	99.98	0.000	Pass	16.7437	278.30	98.03	0.022	Pass	16.7442	278.30	100.00	0.000	Pass	16.7405	278.310	99.98	0.000	Pass
2	17.0821	277.98	17.0769	277.98	99.97	0.000	Pass	16.7383	277.93	98.02	0.018	Pass	16.7414	277.93	100.00	0.000	Pass	16.7365	277.940	99.97	0.000	Pass
3	17.0800	278.44	17.0741	278.43	99.97	0.004	Pass	16.7349	278.39	98.01	0.014	Pass	16.7382	278.38	100.00	0.004	Pass	16.7332	278.390	99.97	0.000	Pass
4	17.0845	279.12	17.0762	279.11	99.95	0.004	Pass	16.7362	279.07	98.01	0.014	Pass	16.7396	279.07	100.00	0.000	Pass	16.7342	279.080	99.97	0.000	Pass

B. 25th cycle fully charged state

5	17.0836	277.70	17.0767	277.70	99.96	0.000	Pass	16.7363	277.66	98.01	0.014	Pass	16.7389	277.65	100.00	0.004	Pass	16.7342	277.650	99.97	0.000	Pass
6	17.0856	279.03	17.0795	279.03	99.96	0.000	Pass	16.7401	278.98	98.01	0.018	Pass	16.7428	278.98	100.00	0.000	Pass	16.7380	278.980	99.97	0.000	Pass
7	17.0897	278.54	17.0824	278.54	99.96	0.000	Pass	16.7399	278.48	98.00	0.022	Pass	16.7399	278.47	100.00	0.004	Pass	16.7358	278.480	99.98	0.000	Pass
8	17.0843	278.74	17.0777	278.73	99.96	0.004	Pass	16.7375	278.69	98.01	0.014	Pass	16.7384	278.68	100.00	0.004	Pass	16.7324	278.700	99.96	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	16.7405	58.30	Pass
2	16.7365	59.12	Pass
3	16.7332	58.42	Pass
4	16.7342	58.10	Pass

B. 25th cycle fully charged state

5	16.7342	58.52	Pass
6	16.7380	58.46	Pass
7	16.7358	58.47	Pass
8	16.7324	58.45	Pass

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

A. 1st cycle fully charged state

9	17.0824	24.11	Pass
10	17.0770	23.85	Pass
11	17.0836	23.91	Pass
12	17.0738	23.81	Pass

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

B. 25th cycle fully charged state

13	17.0824	23.87	Pass
14	17.0846	23.71	Pass
15	17.0860	23.67	Pass
16	17.0822	23.65	Pass

2-3. T6/T8 Test Result (P5140D3A1)

Cell Document Number	QDI-191104-C-P5140D3A1
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Crush (T6)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result

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

A. 1st cycle 50% charged state

11	3.8577	22.36	Pass
12	3.8574	22.60	Pass
13	3.8576	23.10	Pass
14	3.8578	24.77	Pass
15	3.8578	24.56	Pass

A. 1st cycle fully discharged state

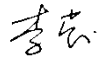
21	3.4806	83.60	Pass
22	3.4799	89.80	Pass
23	3.4879	85.82	Pass
24	3.4815	87.59	Pass
25	3.4803	84.48	Pass
26	3.4804	78.92	Pass
27	3.4800	90.22	Pass
28	3.4805	78.56	Pass
29	3.4799	80.88	Pass
30	3.4792	81.76	Pass

B. 25th cycle fully discharged state

31	3.4726	88.49	Pass
32	3.4748	84.55	Pass
33	3.4735	78.65	Pass
34	3.4740	84.93	Pass
35	3.4726	78.46	Pass
36	3.4748	90.67	Pass
37	3.4758	85.96	Pass
38	3.4780	88.16	Pass
39	3.4728	82.64	Pass
40	3.4752	86.15	Pass

B. 25th cycle 50% charged state

16	3.8638	22.32	Pass
17	3.8654	22.99	Pass
18	3.8656	22.66	Pass
19	3.8648	22.47	Pass
20	3.8660	22.54	Pass

Document Number	QDI-200318-B-L19L4PDC-D1	
Prepared	Jie Ma	
Approved	Ying Li	

1.2m Drop Test Report

- L19L4PDC (Nom. 71.00Wh, 15.40V) -

2020. 03. 18



1.2m Drop Test Report

A. Test Information

Standard requirement or The Clause Number of Standard	Test Condition	Requirement
UNITED NATIONS “Recommendations on the TRANSPORT OF DANGEROUS GOODS” Model Regulations(18 th) special provisions 188	1.2m Box Drop - 1st drop : corner - 2nd drop : flat on the bottom - 3rd drop : flat on the top - 4th drop : flat on the long side - 5th drop : flat on the short side 	Without ; - Damage to cells or batteries contained therein - Shifting of the contents so as to allow battery to battery (or cell to cell) contact - Release of contents

B. Box Information

Dimensions	385 x 285 x 155 mm	Battery Quantity	32 pcs/Box
Gross weight	10.440 kg	Net Weight of Batteries	8.911kg

C. Image

Image-1	Image-2
	

D. Test Result

Result	Result Detail
PASS	The box was not cracked, the contents were not damaged and not shifted.