



UN38.3 试验概要

UN38.3 Test Summary

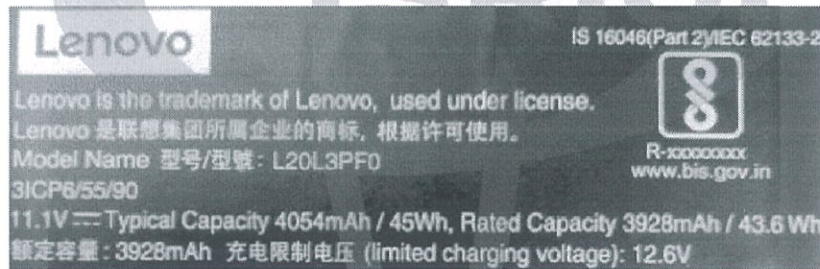
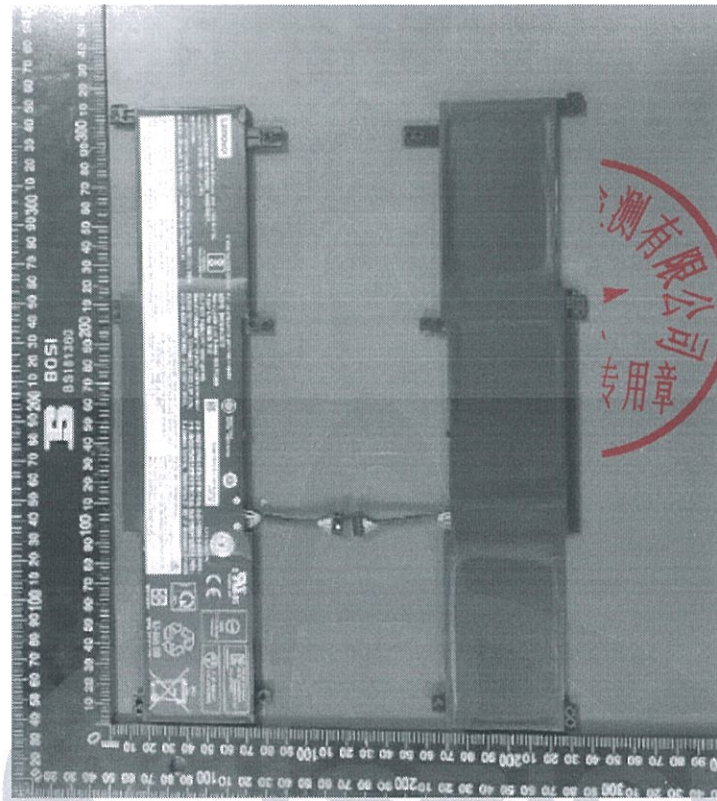


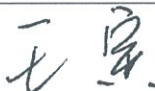
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单位信息 Company information			
委托单位 Consignor	乐金化学(南京)信息电子材料有限公司 LG Chem(Nanjing) I&E Materials Co.,Ltd 南京经济技术开发区恒谊路 17 号 NO 17 HENGYI RD NANJING ECONOMICAL & TECHNICAL DEVELOPMENT ZONE 025-85603000 zhanghonglu@lgchem.com www.lgchem.com		
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电池信息 Battery information			
名称 Name	锂离子电池	品牌 Brand	/
型号 Type	L20L3PF0	原始测试型号 Original tested type	/
标称电压(V) Nominal voltage	11.1	容量/能量 Capacity/energy	Rated:3928mAh 43.6Wh TYP:4054mAh 45Wh
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	0.221	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-200903-B-L20L3PF0	测试报告日期 Date of test report	2020-09-03
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 2020-09-11 

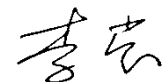
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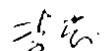
报告结束

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-200903-B-L20L3PF0	Test 1. Altitude Simulation	Pass
Date of test report	2020.09.03	Test 2. Thermal Test	Pass
Model name	L20L3PF0	Test 3. Vibration	Pass
Nominal voltage (V)	11.10	Test 4. Shock	Pass
Capacity (Nominal Wh)	45.00	Test 5. External Short Circuit	Pass
Weight (g)	220.90	Test 6. Impact or Crush	Pass
Dimensions (mm)	307.00X66.15X6.70	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-200903-B-L20L3PF0	
Prepared	Jie Ma	
Approved	Ying Li	

UN38.3 Test Report

– L20L3PF0 (Nom. 45.00Wh, 11.10V) –

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2020. 09. 03

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	12.1438	220.89	12.1365	220.89	99.94	0.000	Pass	12.0215	220.89	99.05	0.000	Pass	12.0199	220.89	99.99	0.000	Pass	12.0154	220.88	99.96	0.005	Pass
2	12.1403	220.51	12.1331	220.50	99.94	0.005	Pass	12.0149	220.50	99.03	0.000	Pass	12.0135	220.50	99.99	0.000	Pass	12.0115	220.49	99.98	0.005	Pass
3	12.1402	220.42	12.1350	220.41	99.96	0.005	Pass	12.0130	220.41	98.99	0.000	Pass	12.0119	220.40	99.99	0.005	Pass	12.0082	220.39	99.97	0.005	Pass
4	12.1417	220.90	12.1340	220.88	99.94	0.009	Pass	12.0105	220.87	98.98	0.005	Pass	12.0143	220.87	100.00	0.000	Pass	12.0087	220.86	99.95	0.005	Pass

B. 25th cycle fully charged state

5	12.1446	220.60	12.1396	220.58	99.96	0.009	Pass	12.0124	220.58	98.95	0.000	Pass	11.9612	220.58	99.57	0.000	Pass	11.8960	220.56	99.45	0.009	Pass
6	12.1493	220.61	12.1448	220.61	99.96	0.000	Pass	12.0175	220.62	98.95	0.000	Pass	12.0123	220.60	99.96	0.009	Pass	11.9434	220.60	99.43	0.000	Pass
7	12.1457	220.47	12.1405	220.46	99.96	0.005	Pass	12.0134	220.47	98.95	0.000	Pass	11.9620	220.45	99.57	0.009	Pass	11.8930	220.45	99.42	0.000	Pass
8	12.1453	220.37	12.1363	220.36	99.93	0.005	Pass	12.0098	220.38	98.96	0.000	Pass	11.9591	220.38	99.58	0.000	Pass	11.8994	220.36	99.50	0.009	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	12.0154	58.17	Pass
2	12.0115	58.17	Pass
3	12.0082	57.26	Pass
4	12.0087	57.51	Pass

B. 25th cycle fully charged state

5	11.8960	58.25	Pass
6	11.9434	58.34	Pass
7	11.8930	57.28	Pass
8	11.8994	57.87	Pass

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

A. 1st cycle fully charged state

9	12.1316	25.52	Pass
10	12.1372	25.16	Pass
11	12.1332	25.22	Pass
12	12.1326	24.82	Pass

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

B. 25th cycle fully charged state

13	12.1321	24.78	Pass
14	12.1394	24.52	Pass
15	12.1150	24.38	Pass
16	12.1445	24.25	Pass

2-3. T6/T8 Test Result (ICP595490L1)

Crush (T6)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle 50% charged state

C-1	3.8228	21.46	Pass
C-2	3.8229	22.39	Pass
C-3	3.8236	21.25	Pass
C-4	3.8240	23.84	Pass
C-5	3.8234	24.18	Pass

B. 25st cycle 50% charged state

C-6	3.8353	21.84	Pass
C-7	3.8366	22.44	Pass
C-8	3.8361	21.31	Pass
C-9	3.8363	21.39	Pass
C-10	3.8310	22.91	Pass

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

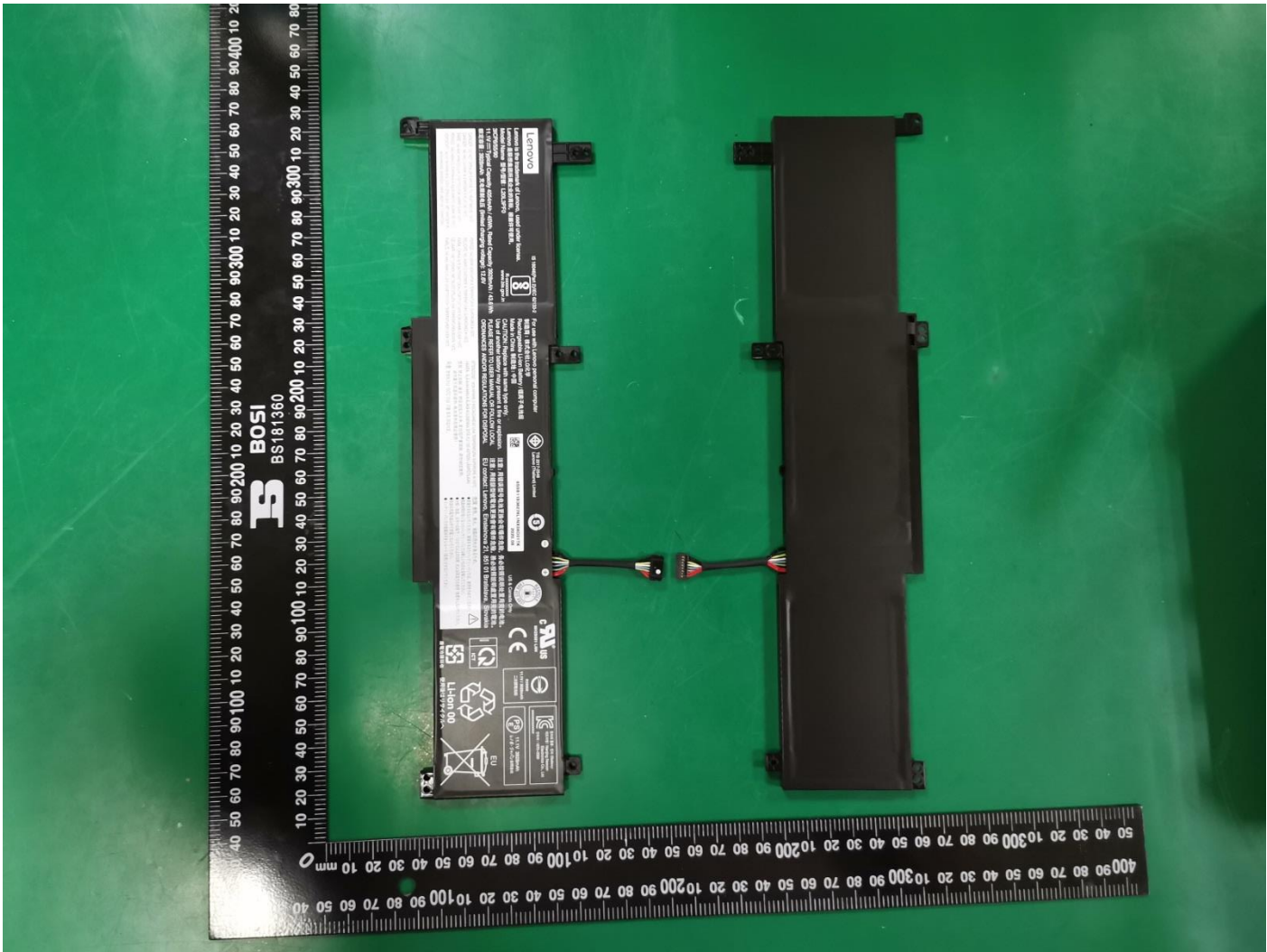
A. 1st cycle fully discharged state

C-6	3.3474	78.51	Pass
C-7	3.3464	74.92	Pass
C-8	3.3460	84.23	Pass
C-9	3.3517	67.43	Pass
C-10	3.3491	80.49	Pass
C-11	3.3487	70.94	Pass
C-12	3.3521	77.45	Pass
C-13	3.3458	72.77	Pass
C-14	3.3538	81.26	Pass
C-15	3.3480	76.38	Pass

B. 25th cycle fully discharged state

C-16	3.3792	85.77	Pass
C-17	3.4483	80.98	Pass
C-18	3.4197	88.51	Pass
C-19	3.3501	76.73	Pass
C-20	3.4513	83.90	Pass
C-21	3.4337	85.58	Pass
C-22	3.4360	70.08	Pass
C-23	3.4284	72.78	Pass
C-24	3.4476	82.23	Pass
C-25	3.4478	79.70	Pass

3. Sample Image



Document Number	QDI-200819-B-L20L3PF0-D1	
Prepared	Jie Ma	
Approved	Ying Li	

1.2m Drop Test Report

– L20L3PF0 (Nom. 45.00Wh, 11.10V) –

2020. 08. 19



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(18th) 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	380*285*160mm	Battery Quantity	30pcs/Box
Gross weight	8.120 kg	Net Weight of Batteries	6.620 kg

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.