



UN38.3 试验概要

UN38.3 Test Summary



812000500092882

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.lgensol.com
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测试单位 Test lab	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.lgensol.com

电池信息 Battery information

名称 Name	锂离子电池	品牌 Brand	/
型号 Type	L20L4PC1	原始测试型号 Original tested type	/
标称电压(V) Nominal voltage	15.36	容量/能量 Capacity/energy	TYP.5210mAh 80Wh Rat.5100mAh 78Wh
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	0.342	外观 Appearance	黑色塑料薄膜外壳 Black plastic film shell

测试信息 Test information

原报告编号 Original test report No.	QDI-201215-B-L20L4PC1	测试报告日期 Date of test report	2020-12-15
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)	/



声 明

Statement

1. 试验概要无本实验室公章（或检验检测专用章）无效。

The test summary is invalid if it is not affixed the official seal of the laboratory to it.

2. 复制试验概要未重新加盖本实验室公章（或检验检测专用章）无效。

Copies of the test summary without the official seal of the laboratory are invalid.

3. 试验概要无签字及签字者姓名和职务无效。

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4. 试验概要涂改无效。

The test summary is invalid if it is blotted out.

5. 未经本实验室书面批准，不得部分复制试验概要。

It is forbidden to copy the test summary partially without the written approval of the laboratory.

6. 试验概要中描述的检测结果，仅对所测样品有效。

The conclusion of the test summary is only valid for the tested sample.

7. 试验概要以中文为准，英文文本（如有）仅为译文，两者发生冲突时，应以中文文本为准。

The test summary has been drafted in Chinese and translated into English (if exist) for convenience only. In the event of discrepancy, the Chinese version shall prevail.

地址：上海市云岭东路 345 号 Address: No. 345 East Yunling Road, Shanghai

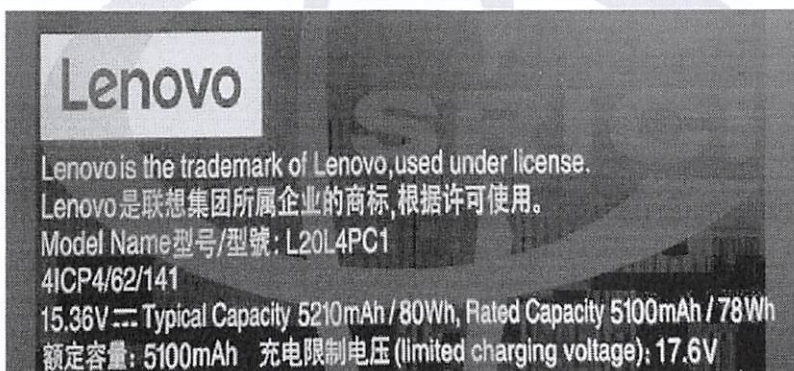
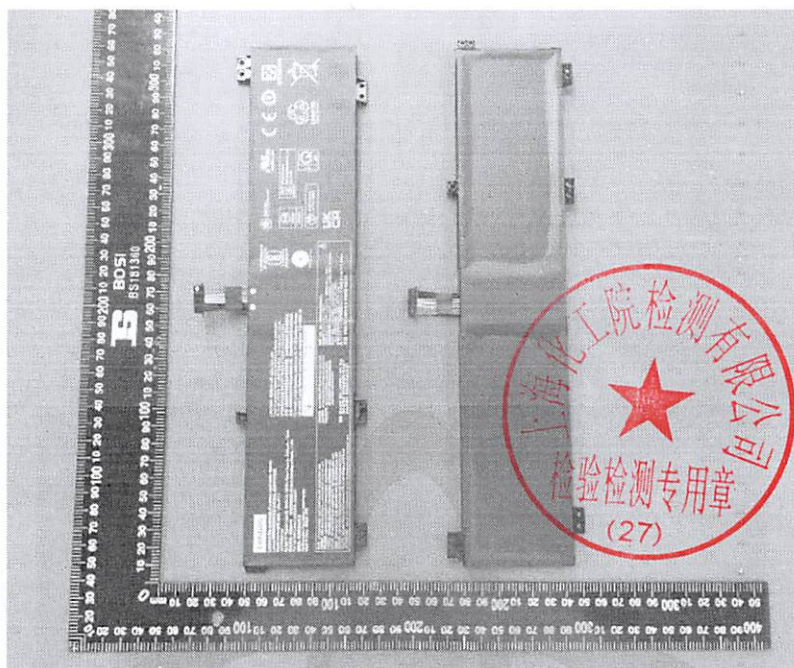
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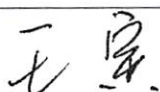
电话(Tel): (021) 31765555 传真(Fax): (021) 31015117

网址(website): www.ghs.cn

电子信箱(E-mail): battery@ghs.cn

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	2020-12-20

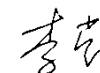
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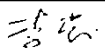
报告结束

UN38.3 Test Summary

Manufacturer's contact information	LG Energy Solution, LTD. 188, Munji-ro, Yuseong-gu, Daejeon, Republic of Korea Telephone : +82-42-870-6195 E-mail : kkammy@lgensol.com Website : www.lgensol.com		
Test Laboratory information	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.lgensol.com		
Description		List of Test Completed	
Cell/Battery Type (Physical Description)	Lithium Ion battery cell (Pouch)	Revised edition	Revision 6 Amendment 1
Test Report Number	QDI-201215-B-L20L4PC1	Test 1. Altitude Simulation	Pass
Date of test report	2020.12.15	Test 2. Thermal Test	Pass
Model name	L20L4PC1	Test 3. Vibration	Pass
Nominal voltage (V)	15.36	Test 4. Shock	Pass
Capacity (mAh / Wh)	5100 / 78.00	Test 5. External Short Circuit	Pass
Weight (g)	341.10	Test 6. Crush	Pass
Dimensions (mm)	310.00 X 65.00 X 8.60	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.
 E-mail: njliying@lgchem.com



Document Number	QDI-201215-B-L20L4PC1	
Prepared	Jie Ma	
Approved	Ying Li	

UN38.3 Test Report

– L20L4PC1(15.36 V, 5100mAh / 78.00Wh) –

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3. Sample Image

2020. 12. 15

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 <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		
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 (dia ≥ 18mm)
Test 6. Crush	Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation		for cylindrical cells (dia < 18mm) 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 $Rt = \frac{12V + Vc}{Max\ discharge\ current}$ - Rc-Rw

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	17.1483	340.38	17.1422	340.38	99.96	0.000	Pass	16.8049	340.31	98.03	0.021	Pass	16.8061	340.31	100.00	0.000	Pass	16.7804	340.30	99.85	0.003	Pass
2	17.1540	340.77	17.1482	340.76	99.97	0.003	Pass	16.8043	340.70	97.99	0.018	Pass	16.8075	340.70	100.00	0.000	Pass	16.7802	340.69	99.84	0.003	Pass
3	17.1518	340.86	17.1454	340.86	99.96	0.000	Pass	16.7954	340.79	97.96	0.021	Pass	16.7992	340.78	100.00	0.003	Pass	16.7724	340.77	99.84	0.003	Pass
4	17.1472	341.10	17.1412	341.09	99.97	0.003	Pass	16.7864	341.03	97.93	0.018	Pass	16.7910	341.02	100.00	0.003	Pass	16.7632	341.02	99.83	0.000	Pass

B. 25th cycle fully charged state

5	17.1663	340.68	17.1610	340.68	99.97	0.000	Pass	16.8219	340.62	98.02	0.018	Pass	16.7595	340.62	99.63	0.000	Pass	15.9846	340.61	95.38	0.003	Pass
6	17.1637	340.42	17.1588	340.41	99.97	0.003	Pass	16.8236	340.36	98.05	0.015	Pass	16.7665	340.36	99.66	0.000	Pass	15.9886	340.35	95.36	0.003	Pass
7	17.1682	340.85	17.1636	340.84	99.97	0.003	Pass	16.8281	340.79	98.05	0.015	Pass	16.7658	340.79	99.63	0.000	Pass	15.9916	340.78	95.38	0.003	Pass
8	17.1606	340.71	17.1554	340.70	99.97	0.003	Pass	16.8208	340.65	98.05	0.015	Pass	16.7684	340.65	99.69	0.000	Pass	15.9864	340.63	95.34	0.006	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	16.7804	58.33	Pass
2	16.7802	58.29	Pass
3	16.7724	57.21	Pass
4	16.7632	57.82	Pass

B. 25th cycle fully charged state

5	15.9846	58.25	Pass
6	15.9886	58.24	Pass
7	15.9916	57.15	Pass
8	15.9864	57.77	Pass

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

A. 1st cycle fully charged state

9	17.1431	23.21	Pass
10	17.1585	23.15	Pass
11	17.1510	23.11	Pass
12	17.1502	23.01	Pass

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

B. 25th cycle fully charged state

13	17.1650	23.07	Pass
14	17.1674	22.90	Pass
15	17.1599	22.97	Pass
16	17.1601	22.94	Pass

2-3. T6/T8 Test Result (ICP645465B1)

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

A. 1st cycle 50% charged state

C-1	3.863	21.33	Pass
C-2	3.863	21.60	Pass
C-3	3.865	21.33	Pass
C-4	3.864	21.74	Pass
C-5	3.863	21.69	Pass

B. 25st cycle 50% charged state

C-6	3.868	21.68	Pass
C-7	3.869	21.42	Pass
C-8	3.868	21.49	Pass
C-9	3.869	21.61	Pass
C-10	3.871	21.60	Pass

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

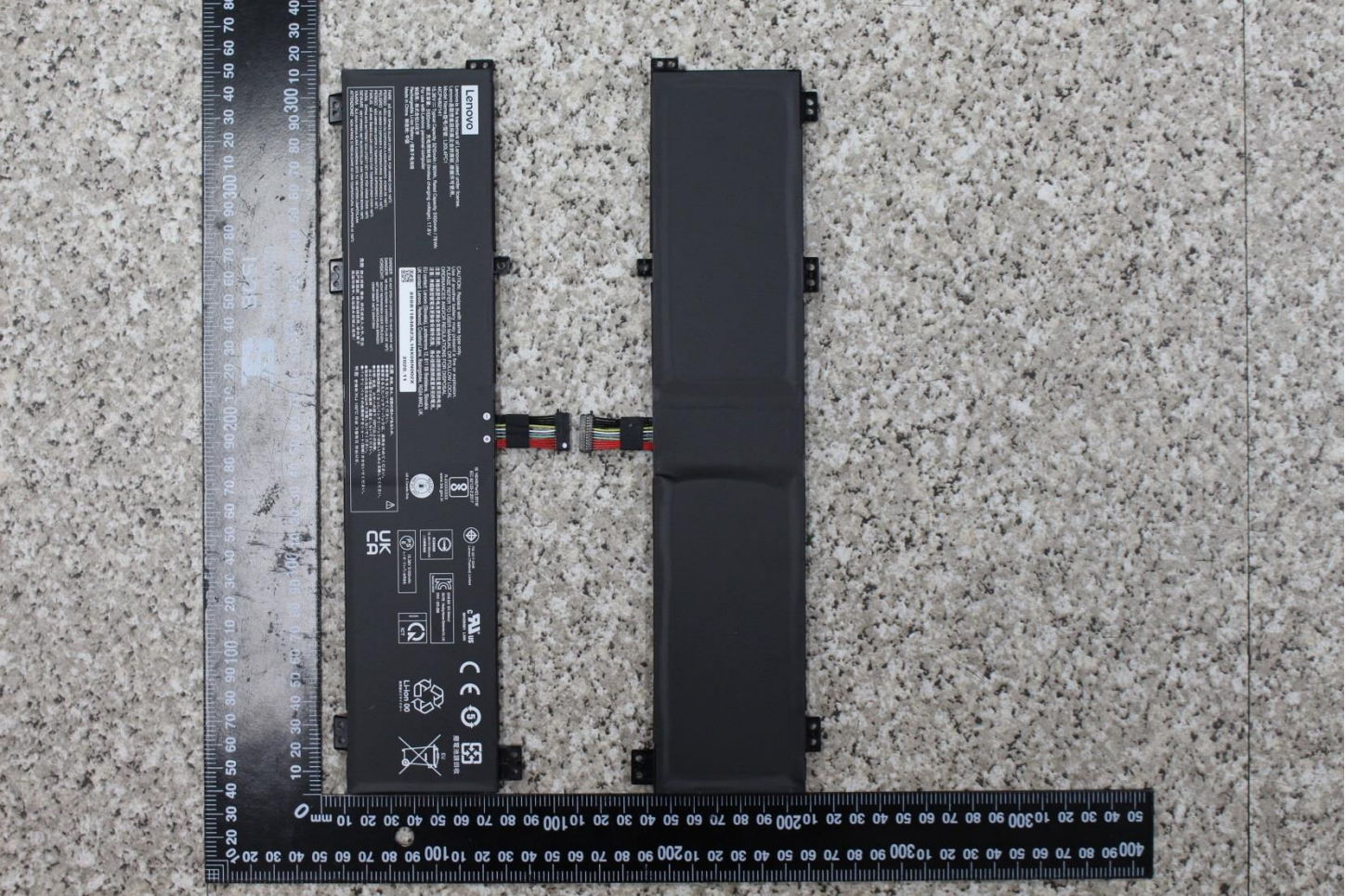
A. 1st cycle fully discharged state

C-6	3.318	69.42	Pass
C-7	3.329	60.91	Pass
C-8	3.339	70.57	Pass
C-9	3.329	66.00	Pass
C-10	3.327	61.12	Pass
C-11	3.328	66.84	Pass
C-12	3.327	62.09	Pass
C-13	3.328	68.26	Pass
C-14	3.358	63.58	Pass
C-15	3.365	66.03	Pass

B. 25th cycle fully discharged state

C-16	3.307	75.76	Pass
C-17	3.313	71.61	Pass
C-18	3.320	76.95	Pass
C-19	3.315	69.90	Pass
C-20	3.317	60.68	Pass
C-21	3.321	60.87	Pass
C-22	3.323	68.31	Pass
C-23	3.330	63.32	Pass
C-24	3.326	61.78	Pass
C-25	3.331	72.33	Pass

3. Sample Image



Document Number	QDI-201215-B-L20L4PC1-D1	
Prepared	Jie Ma	
Approved	Ying Li	

1.2m Drop Test Report

- L20L4PC1 (15.36V, 5100mAh) -

2020. 12. 15

1.2m Drop Test Report

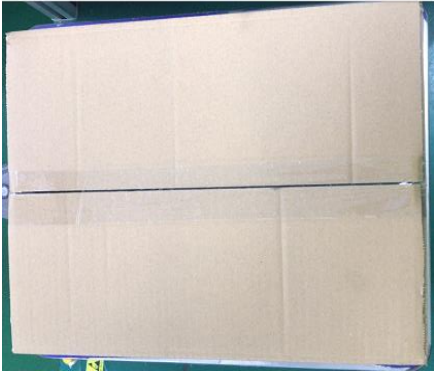
A. Test Information

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 175mm	Battery Quantity	24 pcs/Box
Gross weight	9.580 kg	Net Weight of Batteries	8.177 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.