



LG Chem, Ltd.

128, Yeoui-daero, Yeongdeungpo-gu,
Seoul, Korea

Certification & Evaluation Team
Tel: 82-42-870-6195, Fax: 82-42-863-0182
If any of pages is not legible or has not been received,
please notify our office for re-transmission

CERTIFICATE OF COMPLIANCE

The following product has been evaluated according to the 5th revised edition Amendment2 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 and batteries and single cell batteries.




<input type="checkbox"/> Lithium-ion cell <input checked="" type="checkbox"/> Lithium-ion battery <input type="checkbox"/> Lithium-ion single cell battery	
Model name	L16L6PC1
Cell Model name	P4043B0A1
Nominal voltage	11.58 V
Electric power capacity	72 Wh
Lithium equivalent content	1.865 g

Conducted By: Min Je Woo

Reviewed By: Dae Ho Nam

Assistant Manager
Global Standard Certification Part
LG Chem, Ltd.
E-mail: milkis@lgchem.com

Senior Manager
Global Standard Certification Part
LG Chem, Ltd.
E-mail: kkammy@lgchem.com

문서번호	QDI-160928-B-L16L6PC1	
Prepared	남익현	
Reviewed	우민제	
Approved	남대호	

UN38.3 Test Report

- L16L6PC1 (Nom.72Wh, 11.58V)-

목 차

1. UN38.3 Test Condition
2. General Information
3. Test Result
4. Sample Image

2016. 09. 28

1. UN38.3 Test Condition

Rev.5 / Amd.2

Test item	Test Condition	Requirements	Etc.
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5℃	<ul style="list-style-type: none"> - After OCV (%) ≥ 90% - No leakage, no venting, no disassembly, no rupture, no fire - Mass loss limit (leakage) <ol style="list-style-type: none"> 1) If $M < 1g$, less than 0.5%, 2) If $1g \leq M \leq 75g$, less than 0.2%, 3) If $M > 75g$, less than 0.1% 	<p>T1~T5 : Sequence Tests</p> <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 (peak acceleration : 150gn, pulse duration : 6msec) x 6 (±x, y, z), direction x 3 cycle		
Test 5. External Short Circuit	100mΩ ext. short-circuit at 55±2℃ 1hr continue after returning at 55±2℃		
Test 6. Impact	Φ=15.8±0.1mm bar, 9.1±0.1kg mass, 61±2.5cm height	<ul style="list-style-type: none"> - 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)	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - No disassembly, no fire within 7 days after the test 	Resistance of Electric Loader 1/Ω = (max. discharge current) / (12 + Initial OCV)

2. General Information

1. Standard charge / discharge Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 4298 mA Voltage = 13.2 V	Current = 362 mA
Discharge	CC	Current = 1250 mA	Voltage = 9.6 V

2. Cycle Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 4298 mA Voltage = 13.2 V	Current = 362 mA
Discharge	CC	Current = 1250 mA	Voltage = 9.6 V

3. Test Condition

	Mode	Condition
Test 7. Overcharge	CC / CV	Max. Charge Current = 4298 mA CC/CV 2Imax (8.596A) 22V cut-off 24Hr
Test 8. Forced Discharge	CC	Max. Discharge Current = 3070 mA Duration Time = 60 min

3-1. 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	13.183	283.75	13.180	283.73	99.98	0.007	Pass	13.044	283.72	98.97	0.004	Pass	13.039	283.71	99.96	0.004	Pass	13.038	283.70	99.99	0.004	Pass
2	13.157	283.29	13.146	283.28	99.92	0.004	Pass	13.011	283.27	98.97	0.004	Pass	13.004	283.26	99.95	0.004	Pass	12.994	283.25	99.92	0.004	Pass
3	13.158	283.00	13.150	282.99	99.94	0.004	Pass	13.012	282.97	98.95	0.007	Pass	13.007	282.96	99.96	0.004	Pass	13.006	282.95	99.99	0.004	Pass
4	13.143	283.26	13.135	283.24	99.94	0.007	Pass	12.997	283.23	98.95	0.004	Pass	12.992	283.21	99.96	0.007	Pass	12.981	283.19	99.92	0.007	Pass

B. 50th cycle fully charged state

5	13.164	283.58	13.156	283.57	99.94	0.007	Pass	12.978	283.55	98.65	0.007	Pass	12.972	283.54	99.95	0.004	Pass	12.968	283.52	99.97	0.007	Pass
6	13.160	282.97	13.149	282.96	99.92	0.006	Pass	12.981	282.94	98.72	0.007	Pass	12.977	282.93	99.97	0.004	Pass	12.971	282.91	99.95	0.007	Pass
7	13.156	283.38	13.152	283.37	99.97	0.006	Pass	12.961	283.35	98.55	0.007	Pass	12.952	283.33	99.93	0.007	Pass	12.947	283.32	99.96	0.004	Pass
8	13.163	283.03	13.150	283.02	99.90	0.015	Pass	12.981	283.01	98.71	0.004	Pass	12.978	282.99	99.98	0.007	Pass	12.976	282.98	99.98	0.004	Pass

3-2. T5/T7 Test Result

EXT.Short Circuit (T5)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully charged state

1	13.038	55.11	Pass
2	12.994	55.26	Pass
3	13.006	55.95	Pass
4	12.981	56.04	Pass

B. 50th cycle fully charged state

5	12.968	55.93	Pass
6	12.971	56.13	Pass
7	12.947	56.35	Pass
8	12.976	55.02	Pass

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

A. 1st cycle fully charged state

9	13.140	24.54	Pass
10	13.145	23.83	Pass
11	13.144	24.67	Pass
12	13.145	23.98	Pass

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

B. 50th cycle fully charged state

13	13.128	24.90	Pass
14	13.129	23.31	Pass
15	13.126	23.58	Pass
16	13.123	23.64	Pass

3-3. T6/T8 Test Result (P4043B0A1)

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

A. 1st cycle 50% charged state

C-1	3.849	23.13	Pass
C-2	3.866	23.24	Pass
C-3	3.874	23.12	Pass
C-4	3.867	23.21	Pass
C-5	3.846	23.10	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	3.012	46.88	Pass
C-7	3.016	45.91	Pass
C-8	3.021	44.73	Pass
C-9	3.019	47.16	Pass
C-10	3.051	48.71	Pass
C-11	3.048	47.87	Pass
C-12	3.042	47.58	Pass
C-13	3.035	47.96	Pass
C-14	3.048	46.81	Pass
C-15	3.017	47.55	Pass

B. 50th cycle fully discharged state

C-16	3.115	44.86	Pass
C-17	3.192	45.29	Pass
C-18	3.152	44.54	Pass
C-19	3.142	44.63	Pass
C-20	3.186	45.71	Pass
C-21	3.122	45.85	Pass
C-22	3.216	46.82	Pass
C-23	3.208	45.44	Pass
C-24	3.195	44.96	Pass
C-25	3.186	46.87	Pass

4. Sample Image



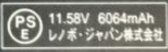
Lenovo

Lenovo is the trademark of Lenovo, used under license.
 Lenovo是联想集团所属企业的商标。根据许可使用
 Rechargeable Li-ion Battery
 锂离子电池组 3ICP4/43/110-2
 Model Name(型号/型号): L16L6PC1
 Manufactured By LGC
 Cell made in China Pack processed in China
 制造地:中国 / 製造地:中国 制造商: LG Chem, Ltd.
 CAUTION: Replace with same type only.
 Use of another battery may present a fire or explosion
 EU contact: Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

Rating: 11.58V --- TYP.6217mAh/72Wh MIN.6064mAh/70Wh
 STORE BETWEEN 0°C~60°C 32°F~140°F
 For use with Lenovo personal computer
 PLEASE REFER TO USER MANUAL OR FOLLOW LOCAL
 ORDINANCES AND/OR REGULATIONS FOR DISPOSAL
 请参考使用说明或者遵循相关法律规定处理废弃电池
 额定容量: 6064mAh 充电限制电压: 13.2V



TIS 2217-2548
 Lenovo (Thailand) Limited



! FARE: MÅ IKKE ÅPNES ELLER UTSETTES FOR VARME OVER 100°C
 PELIGRO: NO ABRIR O EXPONER A TEMPERATURAS SUPERIORES A 100°C
 PERIGLO: NÃO ABRIR NEM EXPOR A TEMPERATURAS SUPERIORES A 100°C
 PERIGLO: NÃO ABRIR OU EXPOR A AQUECIMENTO ACIMA DE 100°C
 VORSICHT! NICHT ERÖFFNEN ODER ZERLEGEN, MIT WASSER
 IN BERÜHRUNG BRINGEN ODER ÜBER 100°C ERWÄRMEN
 DANGER: DO NOT OPEN OR EXPOSE TO HEAT ABOVE 100°C
 DANGER! NE PAS OUVRIRE NI EXPOSER À PLUS DE 100°C
 GEVAAR! NIET OPENEN, NIET BLOOTSTELLEN AAN TEMPERATUREN BOVEN 100°C

FARLIG: MÅ IKKE ÅPNES ELLER UDSÆTTES FOR TEMPERATURER OVER 100°C
ATTENZIONE! NON APRIRE O RISCALDARE AD UNA TEMPERATURA SUPERIORE AI 100°C
FARA: ÖPNA INTE BATTERIEN O UTVÄRTA SET INTE FÖR VÄRME ÖVER 100°C
VAARA: ÄLÄÄNÄ AVOIN ÄLÄÄ KÄMMENÄ SIÄ YU 100 ASTEEN LÄMPÖLÄMÄ
危険: 表紙、先头、破裂の恐れがあるため。
 ●衝撃を与えないでください。
 ●衝撃を与えたバッテリーパックは、使用をやめてください。
 ●破裂の恐れがあるバッテリーパックは新しいものと交換してください。
 ●分解・改造、火中への投下・100°C以上の加熱、および高温での使用・衝撃をしないでください。
 ●指定の充電方法以外で充電しないでください。
 ●バッテリーパックの金属端子をショート(短絡)させないでください。

注意: 用錯誤型號電池更換會有爆炸危險
務必按照說明處置用完的電池

위험: 분해하거나 100°C 이상 가열하지 마십시오.
危険: 禁止拆卸、撞击、外部短路或投入火中。若出现严重故障，请勿继续使用。
 请勿置于高温环境中。电池浸水后禁止使用!

▼ M2X5

▼ M2X5