



CONFIDENTIAL

**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 5<sup>th</sup> 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	<b>L17L2PB3</b>
Cell Model name	<b>ICP595490L2</b>
Nominal voltage	<b>7.6 V</b>
Electric power capacity	<b>30 Wh</b>

Conducted By: Min Je Woo

Reviewed By: Dae Ho Nam

Assistant Manager  
Global Standard Certification Part  
LG Chem, Ltd.  
E-mail: [milkis@lgchem.com](mailto:milkis@lgchem.com)

Senior Manager  
Global Standard Certification Part  
LG Chem, Ltd.  
E-mail: [kkammy@lgchem.com](mailto:kkammy@lgchem.com)

Document Number	QDI-170706-B-L17L2PB3	
Prepared	MyeongHoon Choi	<i>Choi</i>
Reviewed	MinJe Woo	<i>[Signature]</i>
Approved	DaeHo Nam	<i>[Signature]</i>

# UN38.3 Test Report

## - L17L2PB3 (Nom.30Wh, 7.6V)-

### Index

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

2017. 07. 06



# 1. UN38.3 Test Condition

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"> <li>- After OCV (%) ≥ 90%</li> <li>- No leakage, no venting, no disassembly, no rupture, no fire</li> <li>- Mass loss limit (leakage)               <ol style="list-style-type: none"> <li>1) If <math>M &lt; 1g</math>, less than 0.5%,</li> <li>2) If <math>1g \leq M \leq 75g</math>, less than 0.2%,</li> <li>3) If <math>M &gt; 75g</math>, less than 0.1%</li> </ol> </li> </ul>	<p>T1~T5 : Sequence Tests</p> <pre> graph TD     T1[Test 1 Altitude Simulation] --&gt; T2[Test 2 Thermal Test]     T2 --&gt; T3[Test 3 Vibration]     T3 --&gt; T4[Test 4 Shock]     T4 --&gt; 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 1g) 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℃	<ul style="list-style-type: none"> <li>- No disassembly, no rupture, no fire within 6 hours after the test</li> <li>- Max. Temp ≤ 170℃</li> </ul>	
Test 6. Impact	Φ=15.8±0.1mm bar, 9.1±0.1kg mass, 61±2.5cm height	<ul style="list-style-type: none"> <li>- No disassembly, no fire within 6 hours after the test</li> <li>- Max. Temp ≤ 170℃</li> </ul>	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"> <li>- No disassembly, no fire within 7 days after the test</li> </ul>	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"> <li>- No disassembly, no fire within 7 days after the test</li> </ul>	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 = 1920 mA Voltage = 8.7 V	Current = 195 mA
Discharge	CC	Current = 780 mA	Voltage = 6.0 V

### 2. Cycle Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 1920 mA Voltage = 8.7 V	Current = 195 mA
Discharge	CC	Current = 780 mA	Voltage = 6.0 V

### 3. Test Condition

	Mode	Condition
Test 7. Overcharge	CC / CV	Max. Charge Current = 1920 mA CC/CV 2Imax (3840mA) 17.4 V cut-off 24Hr
Test 8. Forced Discharge	CC	Max. Discharge Current = 3900 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	8.673	142.35	8.672	142.30	99.99	0.035	Pass	8.570	142.29	98.82	0.007	Pass	8.552	142.29	99.79	0.000	Pass	8.549	142.28	99.96	0.007	Pass
2	8.677	142.30	8.667	142.29	99.88	0.007	Pass	8.571	142.28	98.89	0.007	Pass	8.532	142.28	99.54	0.000	Pass	8.530	142.28	99.98	0.000	Pass
3	8.670	142.37	8.668	142.37	99.98	0.000	Pass	8.541	142.31	98.53	0.042	Pass	8.539	142.31	99.98	0.000	Pass	8.536	142.29	99.96	0.014	Pass
4	8.686	142.37	8.669	142.37	99.80	0.000	Pass	8.542	142.35	98.54	0.014	Pass	8.540	142.34	99.98	0.007	Pass	8.534	142.33	99.93	0.007	Pass

## B. 50th cycle fully charged state

5	8.687	142.38	8.680	142.38	99.92	0.000	Pass	8.543	142.30	98.42	0.056	Pass	8.540	142.29	99.96	0.007	Pass	8.527	142.28	99.85	0.007	Pass
6	8.674	142.34	8.666	142.34	99.91	0.000	Pass	8.542	142.34	98.57	0.000	Pass	8.539	142.29	99.96	0.035	Pass	8.539	142.28	100.00	0.007	Pass
7	8.682	142.38	8.679	142.38	99.97	0.000	Pass	8.554	142.33	98.56	0.035	Pass	8.542	142.30	99.86	0.021	Pass	8.528	142.29	99.84	0.007	Pass
8	8.681	142.38	8.677	142.38	99.95	0.000	Pass	8.551	142.30	98.55	0.056	Pass	8.545	142.30	99.93	0.000	Pass	8.538	142.29	99.92	0.007	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	8.549	56.31	Pass
2	8.530	56.58	Pass
3	8.536	56.65	Pass
4	8.534	55.87	Pass

### B. 50th cycle fully charged state

5	8.527	55.51	Pass
6	8.539	56.20	Pass
7	8.528	56.58	Pass
8	8.538	55.18	Pass

## Over Charge (T7)

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

### A. 1st cycle fully charged state

9	8.645	24.53	Pass
10	8.641	25.58	Pass
11	8.644	25.66	Pass
12	8.643	25.94	Pass

## Over Charge (T7)

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

### B. 50th cycle fully charged state

13	8.620	26.08	Pass
14	8.627	24.36	Pass
15	8.628	25.97	Pass
16	8.626	25.78	Pass

# 3-3. T6/T8 Test Result (ICP595490L2)

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

**A. 1st cycle 50% charged state**

C-1	3.871	22.13	Pass
C-2	3.868	22.33	Pass
C-3	3.871	22.51	Pass
C-4	3.872	22.85	Pass
C-5	3.870	23.40	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	3.320	43.79	Pass
C-7	3.330	43.28	Pass
C-8	3.333	42.94	Pass
C-9	3.323	43.84	Pass
C-10	3.331	44.13	Pass
C-11	3.311	42.94	Pass
C-12	3.319	43.15	Pass
C-13	3.311	43.98	Pass
C-14	3.311	42.86	Pass
C-15	3.345	45.19	Pass

**B. 50th cycle fully discharged state**

C-16	3.394	42.97	Pass
C-17	3.394	42.35	Pass
C-18	3.412	43.60	Pass
C-19	3.420	44.72	Pass
C-20	3.380	43.38	Pass
C-21	3.386	44.38	Pass
C-22	3.369	44.98	Pass
C-23	3.411	42.57	Pass
C-24	3.414	44.05	Pass
C-25	3.397	42.85	Pass

# 4. Sample Image

