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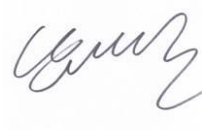
CERTIFICATE OF COMPLIANCE

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.

☐ Lithium-ion cell ☑ Lithium-ion battery ☐ Lithium-ion single cell battery	
Model name	**L15L2PB4**
Cell Model name	**ICP595490L2**
Nominal voltage	**7.6 V**
Electric power capacity	**30 Wh**
Lithium equivalent content	**3.43g**

Conducted By: Dae Ho Nam



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문서번호	QAE-EF02-151124-B-L15L2PB4	
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SolutionPartner

UN38.3 Test Report
- L15L2PB4 (Nom.30Wh, 7.6V)-

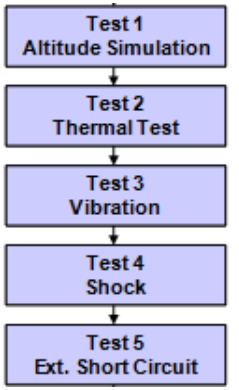
목 차

2015. 11. 24

LG Chem

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℃	- 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 
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℃	- 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	8.657	155.20	8.657	155.20	100.00	0.000	**Pass**	8.539	155.20	98.64	0.000	**Pass**	8.538	155.19	99.99	0.006	**Pass**	8.538	155.19	100.00	0.000	**Pass**
2	8.673	155.31	8.672	155.31	99.99	0.000	**Pass**	8.566	155.29	98.78	0.013	**Pass**	8.563	155.28	99.96	0.006	**Pass**	8.559	155.28	99.95	0.000	**Pass**
3	8.664	155.28	8.661	155.28	99.97	0.000	**Pass**	8.559	155.28	98.82	0.000	**Pass**	8.558	155.27	99.99	0.006	**Pass**	8.555	155.27	99.96	0.000	**Pass**
4	8.671	155.28	8.670	155.28	99.99	0.000	**Pass**	8.552	155.27	98.64	0.006	**Pass**	8.550	155.27	99.98	0.000	**Pass**	8.547	155.26	99.96	0.006	**Pass**
B. 50th cycle fully charged state																						
5	8.665	155.05	8.661	155.04	99.95	0.006	**Pass**	8.560	155.02	98.83	0.013	**Pass**	8.557	155.00	99.96	0.013	**Pass**	8.554	155.00	99.96	0.000	**Pass**
6	8.653	155.36	8.651	155.36	99.98	0.000	**Pass**	8.539	155.35	98.71	0.006	**Pass**	8.535	155.35	99.95	0.000	**Pass**	8.532	155.35	99.96	0.000	**Pass**
7	8.662	155.27	8.662	155.27	100.00	0.000	**Pass**	8.557	155.26	98.79	0.006	**Pass**	8.556	155.25	99.99	0.006	**Pass**	8.553	155.25	99.96	0.000	**Pass**
8	8.668	154.96	8.668	154.95	100.00	0.006	**Pass**	8.554	154.94	98.68	0.006	**Pass**	8.553	154.92	99.99	0.013	**Pass**	8.552	154.91	99.99	0.006	**Pass**

2-2. T5/T7 Test Result

EXT.Short Circuit (T5)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
1	8.538	55.60	Pass
2	8.559	56.27	Pass
3	8.555	54.94	Pass
4	8.547	55.94	Pass
B. 50th cycle fully charged state			
5	8.554	56.32	Pass
6	8.532	56.66	Pass
7	8.553	55.99	Pass
8	8.552	55.89	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
9	8.645	23.91	Pass
10	8.649	24.99	Pass
11	8.646	24.77	Pass
12	8.650	24.48	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state			
13	8.621	23.53	Pass
14	8.623	25.08	Pass
15	8.625	25.14	Pass
16	8.630	24.20	Pass

2-3. T6/T8 Test Result (ICP595490L2)

Crush (T6)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state			
C-1	3.876	23.25	**Pass**
C-2	3.874	23.56	**Pass**
C-3	3.871	23.53	**Pass**
C-4	3.872	23.44	**Pass**
C-5	3.878	23.49	**Pass**

Forced Discharge (T8)

NO.	Initial OCV(V)	Max. Temp (℃)	Result	NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully discharged state				**B. 50th cycle fully discharged state**			
C-6	3.013	46.75	**Pass**	**C-16**	3.114	44.75	**Pass**
C-7	3.011	46.78	**Pass**	**C-17**	3.124	44.34	**Pass**
C-8	3.010	45.55	**Pass**	**C-18**	3.121	43.87	**Pass**
C-9	3.014	46.43	**Pass**	**C-19**	3.119	44.27	**Pass**
C-10	3.007	47.37	**Pass**	**C-20**	3.118	45.87	**Pass**
C-11	3.013	46.68	**Pass**	**C-21**	3.128	45.99	**Pass**
C-12	3.017	46.57	**Pass**	**C-22**	3.121	46.84	**Pass**
C-13	3.007	47.53	**Pass**	**C-23**	3.119	44.93	**Pass**
C-14	3.008	46.66	**Pass**	**C-24**	3.117	44.98	**Pass**
C-15	3.016	45.41	**Pass**	**C-25**	3.120	43.78	**Pass**

3. Sample Image