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

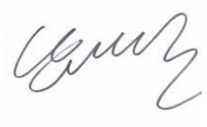
CERTIFICATE OF COMPLIANCE

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.

☐ Lithium-ion cell ☑ Lithium-ion battery ☐ Lithium-ion single cell battery	
Model name	**L15L3PB1**
Cell Model name	**ICP595490L1**
Nominal voltage	**11.1 V**
Electric power capacity	**45 Wh**
Lithium equivalent content	**3.51 g**

Conducted By: Dae Ho Nam



Manager
Certification & Evaluation
LG Chem. Ltd
E-mail: kkammy@lgchem.com

Reviewed By: Byung Soo Kim

General Manager
Certification & Evaluation
LG Chem. Ltd
E-mail: bskim@lgchem.com

문서번호	QAE-EF02-151127-B-L15L3PB1	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	박광민	
Approved	김병수	

SolutionPartner

UN38.3 Test Report
- L15L3PB1 (Nom.45Wh, 11.1V)-

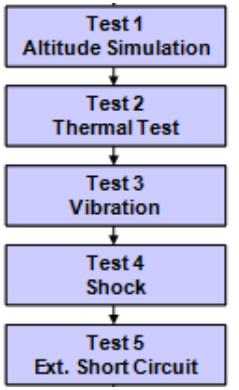
목 차

2015. 11. 27

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	12.558	220.64	12.555	220.64	99.98	0.000	Pass	12.391	220.64	98.69	0.000	Pass	12.386	220.62	99.96	0.009	Pass	12.384	220.62	99.98	0.000	Pass
2	12.557	220.67	12.556	220.66	99.99	0.005	Pass	12.407	220.65	98.81	0.005	Pass	12.406	220.62	99.99	0.014	Pass	12.404	220.62	99.98	0.000	Pass
3	12.553	220.47	12.549	220.47	99.97	0.000	Pass	12.386	220.47	98.70	0.000	Pass	12.386	220.45	100.00	0.009	Pass	12.382	220.44	99.97	0.005	Pass
4	12.551	220.62	12.550	220.62	99.99	0.000	Pass	12.396	220.59	98.77	0.014	Pass	12.395	220.58	99.99	0.005	Pass	12.394	220.58	99.99	0.000	Pass
B. 50th cycle fully charged state																						
5	12.546	220.04	12.546	220.04	100.00	0.000	Pass	12.402	220.02	98.85	0.009	Pass	12.396	220.00	99.95	0.009	Pass	12.392	220.00	99.97	0.000	Pass
6	12.553	220.30	12.548	220.30	99.96	0.000	Pass	12.381	220.27	98.67	0.014	Pass	12.377	220.25	99.97	0.009	Pass	12.376	220.25	99.99	0.000	Pass
7	12.546	220.00	12.542	219.99	99.97	0.005	Pass	12.391	219.98	98.80	0.005	Pass	12.387	219.96	99.97	0.009	Pass	12.387	219.96	100.00	0.000	Pass
8	12.551	220.03	12.550	220.02	99.99	0.005	Pass	12.384	220.01	98.68	0.005	Pass	12.383	219.99	99.99	0.009	Pass	12.382	219.99	99.99	0.000	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	12.384	56.26	Pass
2	12.404	55.80	Pass
3	12.382	55.63	Pass
4	12.394	55.39	Pass
B. 50th cycle fully charged state			
5	12.392	54.95	Pass
6	12.376	56.43	Pass
7	12.387	56.50	Pass
8	12.382	56.04	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
9	12.546	24.31	Pass
10	12.550	24.10	Pass
11	12.541	24.72	Pass
12	12.540	25.18	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state			
13	12.526	24.25	Pass
14	12.524	25.28	Pass
15	12.527	24.97	Pass
16	12.527	24.71	Pass

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

Crush (T6)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state			
C-1	3.749	23.44	**Pass**
C-2	3.753	23.49	**Pass**
C-3	3.747	23.38	**Pass**
C-4	3.754	23.47	**Pass**
C-5	3.750	23.43	**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	3.262	47.56	**Pass**	**C-16**	3.285	43.46	**Pass**
C-7	3.259	46.43	**Pass**	**C-17**	3.352	46.52	**Pass**
C-8	3.298	47.48	**Pass**	**C-18**	3.327	46.80	**Pass**
C-9	3.280	48.55	**Pass**	**C-19**	3.347	43.24	**Pass**
C-10	3.297	47.54	**Pass**	**C-20**	3.366	44.67	**Pass**
C-11	3.238	47.30	**Pass**	**C-21**	3.326	47.32	**Pass**
C-12	3.252	46.59	**Pass**	**C-22**	3.315	43.17	**Pass**
C-13	3.289	45.37	**Pass**	**C-23**	3.361	44.28	**Pass**
C-14	3.298	45.11	**Pass**	**C-24**	3.289	45.14	**Pass**
C-15	3.250	47.08	**Pass**	**C-25**	3.354	44.30	**Pass**

3. Sample Image