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CERTIFICATE OF COMPLIANCE

The following product has been evaluated according to the 6th revised edition 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, batteries and single cell batteries.

☐ Lithium-ion cell ☑ Lithium-ion battery ☐ Lithium-ion single cell battery	
Model name	**L17L2PB5**
Cell Model name	**ICP595490C2**
Nominal voltage	**7.72 V**
Electric power capacity	**39 Wh**

Reviewed By: MinJe Woo

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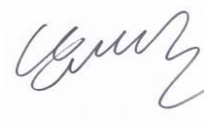

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Document Number	QDI-170726-B-L17L2PB5	
Prepared	MyeongHoon Choi	
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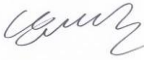
Approved	DaeHo Nam	

UN38.3 Test Report
- L17L2PB5 (Nom.39Wh, 7.72V)-

Index

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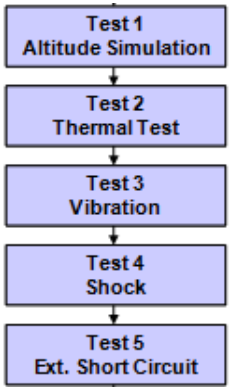
1. UN38.3 Test Condition

Test item	Test Condition	Requirements	Etc.
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5℃	- 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 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℃ in chamber (Measured on external case) 2) Less than 0.1Ω, ext. short-circuit at 57±4℃ 3) 1hr continue after returning to 57±4℃	- 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. General Information

1. Standard charge / discharge Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 2460mA Voltage = 8.8 V	Current = 246 mA
Discharge	CC	Current = 984 mA	Voltage = 6.0 V

2. Cycle Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 2460mA Voltage = 8.8 V	Current = 246 mA
Discharge	CC	Current = 984 mA	Voltage = 6.0 V

3. Test Condition

	Mode	Condition
Test 7. Overcharge	CC / CV	Max. Charge Current = 2706 mA CC/CV 2Imax (5412mA) 22 V cut-off 24Hr
Test 8. Forced Discharge	CC	Max. Discharge Current = 4920 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	8.776	180.09	8.767	180.08	99.90	0.006	Pass	8.677	180.07	98.97	0.006	Pass	8.670	180.07	99.92	0.000	Pass	8.667	180.06	99.97	0.006	Pass
2	8.781	180.03	8.776	180.02	99.94	0.006	Pass	8.686	180.02	98.97	0.000	Pass	8.680	180.01	99.93	0.006	Pass	8.677	180.01	99.97	0.000	Pass
3	8.786	180.02	8.777	180.01	99.90	0.006	Pass	8.680	180.00	98.89	0.006	Pass	8.677	180.00	99.97	0.000	Pass	8.676	180.00	99.99	0.000	Pass
4	8.789	180.07	8.785	180.07	99.95	0.000	Pass	8.694	180.06	98.96	0.006	Pass	8.686	180.05	99.91	0.006	Pass	8.678	180.04	99.91	0.006	Pass
B. 50th cycle fully charged state																						
5	8.774	180.05	8.772	180.04	99.98	0.006	Pass	8.682	180.03	98.97	0.006	Pass	8.675	180.03	99.92	0.000	Pass	8.669	180.03	99.93	0.000	Pass
6	8.788	180.03	8.786	180.02	99.98	0.006	Pass	8.696	180.02	98.98	0.000	Pass	8.695	180.01	99.99	0.006	Pass	8.694	180.00	99.99	0.006	Pass
7	8.783	180.01	8.775	180.00	99.91	0.006	Pass	8.681	179.99	98.93	0.006	Pass	8.672	179.98	99.90	0.006	Pass	8.666	179.98	99.93	0.000	Pass
8	8.776	180.03	8.770	180.02	99.93	0.006	Pass	8.679	180.01	98.96	0.006	Pass	8.675	180.01	99.95	0.000	Pass	8.666	180.01	99.90	0.000	Pass

3-2. T5/T7 Test Result

EXT.Short Circuit (T5)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
1	8.667	56.55	Pass
2	8.677	55.73	Pass
3	8.676	56.47	Pass
4	8.678	56.15	Pass
B. 50th cycle fully charged state			
5	8.669	55.30	Pass
6	8.694	56.03	Pass
7	8.666	55.46	Pass
8	8.666	56.58	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
9	8.742	24.24	Pass
10	8.745	23.52	Pass
11	8.741	24.55	Pass
12	8.740	25.24	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state			
13	8.725	24.83	Pass
14	8.722	24.21	Pass
15	8.724	24.66	Pass
16	8.727	23.80	Pass

3-3. T6/T8 Test Result (ICP595490C2)

Crush (T6)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state			
C-1	3.894	21.28	**Pass**
C-2	3.898	21.45	**Pass**
C-3	3.901	21.34	**Pass**
C-4	3.887	21.49	**Pass**
C-5	3.891	21.38	**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	3.119	42.74	**Pass**	**C-16**	3.126	42.99	**Pass**
C-7	3.112	42.87	**Pass**	**C-17**	3.117	40.38	**Pass**
C-8	3.082	40.83	**Pass**	**C-18**	3.126	43.11	**Pass**
C-9	3.112	41.56	**Pass**	**C-19**	3.106	41.94	**Pass**
C-10	3.087	41.29	**Pass**	**C-20**	3.138	40.67	**Pass**
C-11	3.079	41.32	**Pass**	**C-21**	3.122	42.08	**Pass**
C-12	3.110	40.56	**Pass**	**C-22**	3.148	41.68	**Pass**
C-13	3.085	43.44	**Pass**	**C-23**	3.155	43.03	**Pass**
C-14	3.116	42.94	**Pass**	**C-24**	3.148	41.46	**Pass**
C-15	3.110	42.90	**Pass**	**C-25**	3.109	40.88	**Pass**

4. Sample Image