

UN38.3 Test Summary


The following product has been evaluated according to the 5th revised edition Amendment 2 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.

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Description		List of Test Completed	
Test Report Number	QDI-170627-B-L17L3P61	Test 1. Altitude Simulation	Pass
Date of test report	2017.06.27	Test 2. Thermal Test	Pass
Model name	L17L6P71	Test 3. Vibration	Pass
Type	Pouch	Test 4. Shock	Pass
Nominal voltage	11.4 V	Test 5. External Short Circuit	Pass
Capacity	48.0 Wh	Test 6. Impact or Crush	Pass
Weight	228.0 g	Test 7. Overcharge	Pass
Dimensions	235.00mm X 88.25mm X 6.85mm	Test 8. Forced Discharge	Pass

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UN38.3 Test Report

- L17L6P71 (Nom.48Wh, 11.40V) -

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2017. 06. 27



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 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℃		
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 = 4080 mA Voltage = 13.05 V	Current = 204 mA
Discharge	CC	Current = 816 mA	Voltage = 9.0 V

2. Cycle Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 4080 mA Voltage = 13.05 V	Current = 204 mA
Discharge	CC	Current = 816 mA	Voltage = 9.0 V

3. Test Condition

	Mode	Condition
Test 7. Overcharge	CC / CV	Max. Charge Current = 4488 mA CC/CV 2Imax (8976mA) 22 V cut-off 24Hr
Test 8. Forced Discharge	CC	Max. Discharge Current = 3060 mA Duration Time = 40 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	13.033	228.25	13.019	228.25	99.89	0.000	Pass	12.804	228.24	98.35	0.004	Pass	12.795	228.22	99.93	0.009	Pass	12.783	228.21	99.91	0.004	Pass
2	13.029	228.14	13.014	228.13	99.88	0.004	Pass	12.798	228.10	98.34	0.013	Pass	12.789	228.09	99.93	0.004	Pass	12.769	228.07	99.84	0.009	Pass
3	13.026	228.03	13.012	228.01	99.89	0.009	Pass	12.795	227.99	98.33	0.009	Pass	12.783	227.98	99.91	0.004	Pass	12.766	227.98	99.87	0.000	Pass
4	13.031	228.19	13.019	228.18	99.91	0.004	Pass	12.799	228.16	98.31	0.009	Pass	12.786	228.15	99.90	0.004	Pass	12.768	228.12	99.86	0.013	Pass

B. 50th cycle fully charged state

5	13.021	228.16	13.009	228.15	99.91	0.004	Pass	12.813	228.15	98.49	0.000	Pass	12.805	228.14	99.94	0.004	Pass	12.796	228.13	99.93	0.004	Pass
6	13.028	227.99	13.011	227.97	99.87	0.009	Pass	12.805	227.96	98.42	0.004	Pass	12.797	227.94	99.94	0.009	Pass	12.789	227.94	99.94	0.000	Pass
7	13.031	228.18	13.019	228.17	99.91	0.004	Pass	12.809	228.17	98.39	0.000	Pass	12.800	228.16	99.93	0.004	Pass	12.793	228.15	99.95	0.004	Pass
8	13.030	228.01	13.017	228.00	99.90	0.004	Pass	12.810	227.99	98.41	0.004	Pass	12.802	227.98	99.94	0.004	Pass	12.796	227.96	99.95	0.009	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	12.783	55.49	Pass
2	12.769	55.66	Pass
3	12.766	55.32	Pass
4	12.768	55.56	Pass

B. 50th cycle fully charged state

5	12.796	55.86	Pass
6	12.789	56.19	Pass
7	12.793	55.49	Pass
8	12.796	55.37	Pass

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

A. 1st cycle fully charged state

9	12.993	24.89	Pass
10	12.996	25.76	Pass
11	12.999	25.35	Pass
12	13.003	24.76	Pass

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

B. 50th cycle fully charged state

13	13.005	25.23	Pass
14	12.998	25.61	Pass
15	13.001	24.86	Pass
16	12.997	25.36	Pass

3-3. T6/T8 Test Result (ICP583864L1)

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

A. 1st cycle 50% charged state

C-1	3.814	22.56	Pass
C-2	3.804	23.15	Pass
C-3	3.814	22.98	Pass
C-4	3.814	24.12	Pass
C-5	3.809	23.44	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	45.13	Pass
C-7	3.318	46.54	Pass
C-8	3.318	27.00	Pass
C-9	3.310	44.22	Pass
C-10	3.311	47.69	Pass
C-11	3.289	46.43	Pass
C-12	3.286	48.14	Pass
C-13	3.292	31.07	Pass
C-14	3.284	44.67	Pass
C-15	3.281	46.62	Pass

B. 50th cycle fully discharged state

C-16	3.566	48.70	Pass
C-17	3.563	55.33	Pass
C-18	3.510	57.67	Pass
C-19	3.568	54.25	Pass
C-20	3.555	58.19	Pass
C-21	3.512	57.17	Pass
C-22	3.549	57.81	Pass
C-23	3.511	50.06	Pass
C-24	3.514	53.55	Pass
C-25	3.556	49.70	Pass

