CONFIDENTIAL

UN38.3 Test Summary

The following product has been evaluated according to the 6th revised edition Amendment 1 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.

Manufacture's contact information	LG Chem, ltd. 128 Yeoui-Daero, Yeongdeungpo-gu, SEOUL, 150-721, REPUBLIC OF KOREA Telephone : +86-10-7742-5427 E-mail : kkammy@lgchem.com Website : www.lgchem.com
Test Laboratory information	LG Chem, ltd. / RESEARCH PARK 188 Munjiro, Yuseong-gu, Daejeon, 305-738, REPUBLIC OF KOREA Telephone : +82-10-3099-3724 E-mail : juhongpark@lgchem.com Website : www.lgchem.com
	LG Chem (Nanjing) I&E Materials Co., Ltd NO.17 Hengyi Road, Nanjing Economic & Technological Development Zone, Nanjing, Jiangsu, China Telephone : +86-025-85603000-8288 E-mail : xuyuannj@lgchem.com Website : www.lgchem.com

Description		List of Test Completed	
Test Report Number	QDI-190724-SB-BL-T37	Test 1. Altitude Simulation	Pass
Date of test report	2019.07.24	Test 2. Thermal Test	Pass
Model name	BL-T37	Test 3. Vibration	Pass
Type	Pouch	Test 4. Shock	Pass
Nominal voltage	3.85 V	Test 5. External Short Circuit	Pass
Capacity	12.70Wh	Test 6. Impact or Crush	Pass
Weight	Max 46.0g	Test 7. Overcharge	Pass
Dimensions	Max 44.0mmX93.0mmX4.5mm	Test 8. Forced Discharge	Pass

Approved By: Yuan Xu
Part Leader
Cyl NPI&CE lab part DQA Team
LG Chem, Ltd.
E-mail: xuyuannj@lgchem.com



Document Number	QDI-190724-SB-BL-T37	
Prepared	qianjunli	
Approved	Xuyuan	

CONFIDENTIAL

UN38.3 Test Report
- BL-T37 (Nom. 12.70Wh, 3.85V) -

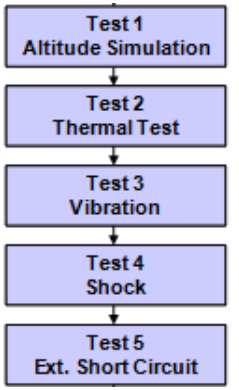
Index

1. UN38.3 Test Condition
2. Test Result
3. Sample Image

2019. 07. 24

LG Chem

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)

2-1. 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	4.343	45.131	4.342	45.130	99.98	0.002	Pass	4.267	45.119	98.27	0.024	Pass	4.266	45.120	99.98	0.000	Pass	4.266	45.120	100.00	0.000	Pass
2	4.343	45.322	4.342	45.321	99.98	0.002	Pass	4.268	45.310	98.30	0.024	Pass	4.267	45.311	99.98	0.000	Pass	4.267	45.311	100.00	0.000	Pass
3	4.343	45.202	4.342	45.202	99.98	0.000	Pass	4.267	45.192	98.27	0.022	Pass	4.267	45.193	100.00	0.000	Pass	4.266	45.192	99.98	0.002	Pass
4	4.342	45.211	4.342	45.210	100.00	0.002	Pass	4.268	45.201	98.30	0.020	Pass	4.267	45.200	99.98	0.002	Pass	4.267	45.200	100.00	0.000	Pass
5	4.343	45.364	4.342	45.362	99.98	0.004	Pass	4.268	45.352	98.30	0.022	Pass	4.267	45.353	99.98	0.000	Pass	4.267	45.353	100.00	0.000	Pass
6	4.343	45.394	4.342	45.395	99.98	0.000	Pass	4.262	45.383	98.16	0.026	Pass	4.268	45.384	100.14	0.000	Pass	4.267	45.384	99.98	0.000	Pass
7	4.343	45.167	4.342	45.166	99.98	0.002	Pass	4.269	45.156	98.32	0.022	Pass	4.267	45.156	99.95	0.000	Pass	4.267	45.156	100.00	0.000	Pass
8	4.341	45.060	4.340	45.060	99.98	0.000	Pass	4.267	45.048	98.32	0.027	Pass	4.266	45.051	99.98	0.000	Pass	4.266	45.050	100.00	0.002	Pass
9	4.334	45.256	4.333	45.252	99.98	0.009	Pass	4.245	45.244	97.97	0.018	Pass	4.244	45.244	99.98	0.000	Pass	4.244	45.244	100.00	0.000	Pass
10	4.344	45.287	4.344	45.286	100.00	0.002	Pass	4.269	45.276	98.27	0.022	Pass	4.268	45.277	99.98	0.000	Pass	4.268	45.277	100.00	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	4.266	58.16	Pass
2	4.267	57.95	Pass
3	4.266	57.48	Pass
4	4.267	46.87	Pass
5	4.267	46.61	Pass
6	4.267	58.10	Pass
7	4.267	57.90	Pass
8	4.266	57.38	Pass
9	4.244	56.84	Pass
10	4.268	56.42	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
11	4.354	23.51	Pass
12	4.355	23.51	Pass
13	4.353	23.31	Pass
14	4.353	23.25	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state			
15	4.369	22.70	Pass
16	4.370	22.70	Pass
17	4.369	22.60	Pass
18	4.370	22.64	Pass

2-3. T6/T8 Test Result (P454493A1)

Crush (T6)

A. 1st cycle 50% charged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result
C-1	3.856	19.34	Pass
C-2	3.856	19.81	Pass
C-3	3.856	19.86	Pass
C-4	3.855	19.85	Pass
C-5	3.855	20.62	Pass

Forced Discharge (T8)

A. 1st cycle fully discharged state / B. 50th cycle fully discharged state

NO.	Initial OCV(V)	Max. Temp (℃)	Result	NO.	Initial OCV(V)	Max. Temp (℃)	Result
C-6	3.478	51.06	Pass	C-16	3.620	60.53	Pass
C-7	3.475	54.00	Pass	C-17	3.622	60.76	Pass
C-8	3.479	51.03	Pass	C-18	3.623	61.70	Pass
C-9	3.467	53.29	Pass	C-19	3.621	60.31	Pass
C-10	3.471	51.46	Pass	C-20	3.627	59.32	Pass
C-11	3.483	54.22	Pass	C-21	3.630	61.87	Pass
C-12	3.484	52.82	Pass	C-22	3.643	60.11	Pass
C-13	3.480	54.21	Pass	C-23	3.626	60.19	Pass
C-14	3.480	51.47	Pass	C-24	3.618	60.72	Pass
C-15	3.480	54.57	Pass	C-25	3.617	60.66	Pass

3. Sample Image

