문서번호	QDI-160203-B-SB10K97569	
Prepared	남익현	
Reviewed	우민제	
Approved	남대호	

SolutionPartner

UN38.3 Test Report
- SB10K97569 (Nom.45Wh, 11.1V) -

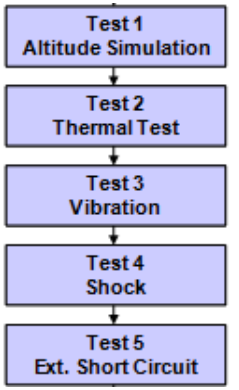
목 차

2016. 02. 03

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	12.572	217.31	12.570	217.30	99.98	0.005	**Pass**	12.371	217.29	98.42	0.005	**Pass**	12.368	217.28	99.98	0.005	**Pass**	12.366	217.27	99.98	0.005	**Pass**
2	12.552	217.54	12.551	217.53	99.99	0.005	**Pass**	12.337	217.52	98.29	0.005	**Pass**	12.333	217.51	99.97	0.005	**Pass**	12.331	217.50	99.98	0.005	**Pass**
3	12.557	217.87	12.550	217.86	99.94	0.005	**Pass**	12.342	217.85	98.34	0.005	**Pass**	12.341	217.85	99.99	0.000	**Pass**	12.338	217.84	99.98	0.005	**Pass**
4	12.559	217.85	12.550	217.84	99.93	0.005	**Pass**	12.330	217.83	98.25	0.005	**Pass**	12.328	217.82	99.98	0.005	**Pass**	12.327	217.82	99.99	0.000	**Pass**
B. 50th cycle fully charged state																						
5	12.553	217.14	12.552	217.14	99.99	0.000	**Pass**	12.312	217.13	98.09	0.005	**Pass**	12.307	217.12	99.96	0.005	**Pass**	12.300	217.11	99.94	0.005	**Pass**
6	12.569	217.97	12.566	217.96	99.98	0.005	**Pass**	12.369	217.96	98.43	0.000	**Pass**	12.360	217.95	99.93	0.005	**Pass**	12.358	217.94	99.98	0.005	**Pass**
7	12.551	217.09	12.550	217.08	99.99	0.005	**Pass**	12.310	217.07	98.09	0.005	**Pass**	12.309	217.07	99.99	0.000	**Pass**	12.308	217.06	99.99	0.005	**Pass**
8	12.567	217.90	12.562	217.89	99.96	0.005	**Pass**	12.320	217.88	98.07	0.005	**Pass**	12.312	217.87	99.94	0.005	**Pass**	12.302	217.87	99.92	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	12.366	56.32	Pass
2	12.331	55.09	Pass
3	12.338	55.57	Pass
4	12.327	55.32	Pass
B. 50th cycle fully charged state			
5	12.300	56.29	Pass
6	12.358	54.74	Pass
7	12.290	55.45	Pass
8	12.302	56.27	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
9	12.548	24.13	Pass
10	12.549	24.88	Pass
11	12.546	25.00	Pass
12	12.548	24.07	Pass

Over Charge (T7)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state			
13	12.528	24.01	Pass
14	12.524	24.66	Pass
15	12.529	24.89	Pass
16	12.528	24.35	Pass

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

Crush (T6)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state			
1	3.733	24.25	Pass
2	3.723	23.95	Pass
3	3.724	23.69	Pass
4	3.733	23.45	Pass
5	3.727	23.47	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**			
6	3.396	80.41	Pass	16	3.780	88.63	Pass
7	3.395	81.99	Pass	17	3.588	78.32	Pass
8	3.399	86.40	Pass	18	3.542	99.41	Pass
9	3.401	79.60	Pass	19	3.591	76.73	Pass
10	3.397	90.31	Pass	20	3.605	88.63	Pass
11	3.980	81.89	Pass	21	3.616	81.87	Pass
12	3.399	84.08	Pass	22	3.572	86.43	Pass
13	3.398	81.53	Pass	23	3.581	88.18	Pass
14	3.398	82.76	Pass	24	3.612	88.15	Pass
15	3.400	73.80	Pass	25	3.578	85.56	Pass

3. Sample Image