




문서번호	QDI-160615-B-SB10K79585	
Prepared	남익현	
Reviewed	우민제	
Approved	남대호	

UN38.3 Test Report

- SB10K79585 (Nom.72Wh, 11.25V) -

목 차

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

2016. 06. 15

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 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℃		
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)

2-1. 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	12.671	332.41	12.665	332.39	99.95	0.006	Pass	12.531	332.38	98.94	0.003	Pass	12.504	332.37	99.78	0.003	Pass	12.483	332.35	99.83	0.006	Pass
2	12.543	332.14	12.429	332.12	99.09	0.006	Pass	12.301	332.11	98.97	0.003	Pass	12.295	332.11	99.95	0.000	Pass	12.234	332.11	99.50	0.000	Pass
3	12.641	332.35	12.634	332.34	99.94	0.003	Pass	12.505	332.33	98.98	0.003	Pass	12.433	332.33	99.42	0.000	Pass	12.342	332.32	99.27	0.003	Pass
4	12.640	332.31	12.619	332.30	99.83	0.003	Pass	12.401	332.29	98.27	0.003	Pass	12.315	332.28	99.31	0.003	Pass	12.241	332.27	99.40	0.003	Pass

B. 50th cycle fully charged state

5	12.662	332.91	12.646	332.90	99.87	0.003	Pass	12.518	332.89	98.99	0.003	Pass	12.396	332.89	99.03	0.000	Pass	12.312	332.87	99.32	0.006	Pass
6	12.563	332.56	12.545	332.55	99.86	0.003	Pass	12.409	332.53	98.92	0.006	Pass	12.287	332.52	99.02	0.003	Pass	12.253	332.51	99.72	0.003	Pass
7	12.568	332.73	12.552	332.71	99.87	0.006	Pass	12.413	332.71	98.89	0.000	Pass	12.294	332.70	99.04	0.003	Pass	12.266	332.69	99.77	0.003	Pass
8	12.568	332.94	12.554	332.93	99.89	0.003	Pass	12.415	332.91	98.89	0.006	Pass	12.298	332.90	99.06	0.003	Pass	12.263	332.89	99.72	0.003	Pass

2-2. T5/T7 Test Result

EXT.Short Circuit (T5)

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

A. 1st cycle fully charged state

1	12.483	55.53	Pass
2	12.234	54.71	Pass
3	12.342	55.42	Pass
4	12.241	54.89	Pass

B. 50th cycle fully charged state

5	12.312	55.81	Pass
6	12.253	54.82	Pass
7	12.266	55.46	Pass
8	12.263	55.27	Pass

Over Charge (T7)

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

A. 1st cycle fully charged state

9	12.433	23.78	Pass
10	12.221	24.64	Pass
11	12.332	23.55	Pass
12	12.229	24.77	Pass

Over Charge (T7)

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

B. 50th cycle fully charged state

13	12.422	23.73	Pass
14	12.220	23.85	Pass
15	12.329	24.01	Pass
16	12.225	23.68	Pass

2-3. T6/T8 Test Result (ICR18650E1)

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

A. 1st cycle 50% charged state

C-1	3.779	25.01	Pass
C-2	3.868	31.72	Pass
C-3	3.779	26.04	Pass
C-4	3.780	53.88	Pass
C-5	3.872	123.73	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	3.244	66.66	Pass
C-7	3.272	68.90	Pass
C-8	3.266	74.22	Pass
C-9	3.260	73.29	Pass
C-10	3.269	69.70	Pass
C-11	3.408	73.17	Pass
C-12	3.372	76.20	Pass
C-13	3.388	75.60	Pass
C-14	3.365	75.87	Pass
C-15	3.372	75.22	Pass

B. 50th cycle fully discharged state

C-16	3.685	75.95	Pass
C-17	3.690	74.27	Pass
C-18	3.691	75.30	Pass
C-19	3.685	67.77	Pass
C-20	3.686	80.25	Pass
C-21	3.692	79.99	Pass
C-22	3.690	78.82	Pass
C-23	3.689	78.08	Pass
C-24	3.687	77.65	Pass
C-25	3.678	73.59	Pass

