




문서번호	QDI-160706-B-SB10L84121	
Prepared	남익현	
Reviewed	우민제	
Approved	남대호	

UN38.3 Test Report

- SB10L84121 (Nom.32Wh, 15.2V) -

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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≤M≤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. General Information

1. Standard charge / discharge Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 2244 mA Voltage = 17.4 V	Current = 102 mA
Discharge	CC	Current = 408 mA	Voltage = 12.0 V

2. Cycle Condition

	Mode	Condition	End Condition
Charge	CC / CV	Current = 2244 mA Voltage = 17.4 V	Current = 102 mA
Discharge	CC	Current = 408 mA	Voltage = 12.0 V

3. Test Condition

	Mode	Condition
Test 7. Overcharge	CC / CV	Max. Charge Current = 2700 mA CC/CV 2Imax (5400 mA) 22V 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	17.387	138.22	17.386	138.22	99.99	0.000	Pass	17.196	138.21	98.91	0.007	Pass	17.182	138.20	99.92	0.007	Pass	17.179	138.19	99.98	0.007	Pass
2	17.351	138.61	17.346	138.60	99.97	0.007	Pass	17.167	138.59	98.97	0.007	Pass	17.152	138.58	99.91	0.007	Pass	17.150	138.57	99.99	0.007	Pass
3	17.343	138.59	17.332	138.58	99.94	0.007	Pass	17.159	138.58	99.00	0.000	Pass	17.148	138.57	99.94	0.007	Pass	17.142	138.55	99.97	0.014	Pass
4	17.358	138.73	17.342	138.73	99.91	0.000	Pass	17.167	138.72	98.99	0.007	Pass	17.159	138.71	99.95	0.007	Pass	17.156	138.70	99.98	0.007	Pass

B. 50th cycle fully charged state

5	17.365	138.85	17.363	138.85	99.99	0.000	Pass	17.134	138.83	98.68	0.014	Pass	17.132	138.82	99.99	0.007	Pass	17.119	138.81	99.92	0.007	Pass
6	17.368	138.21	17.357	138.20	99.94	0.007	Pass	17.145	138.19	98.78	0.007	Pass	17.128	138.18	99.90	0.007	Pass	17.118	138.18	99.94	0.000	Pass
7	17.370	138.13	17.362	138.12	99.95	0.007	Pass	17.103	138.12	98.51	0.000	Pass	17.103	138.12	100.00	0.000	Pass	17.100	138.11	99.98	0.007	Pass
8	17.358	138.45	17.351	138.45	99.96	0.000	Pass	17.130	138.44	98.73	0.007	Pass	17.117	138.44	99.92	0.000	Pass	17.105	138.44	99.93	0.000	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	17.179	54.80	Pass
2	17.150	54.81	Pass
3	17.142	55.67	Pass
4	17.156	55.40	Pass

B. 50th cycle fully charged state

5	17.119	56.34	Pass
6	17.118	56.19	Pass
7	17.100	55.29	Pass
8	17.105	56.63	Pass

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

A. 1st cycle fully charged state

9	17.344	23.53	Pass
10	17.342	25.23	Pass
11	17.346	24.73	Pass
12	17.348	23.65	Pass

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

B. 50th cycle fully charged state

13	17.323	24.44	Pass
14	17.321	23.78	Pass
15	17.330	24.07	Pass
16	17.329	24.02	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	3.852	23.49	Pass
C-2	3.853	23.43	Pass
C-3	3.849	23.49	Pass
C-4	3.851	23.47	Pass
C-5	3.849	23.37	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	3.018	46.33	Pass
C-7	3.009	47.62	Pass
C-8	3.006	46.45	Pass
C-9	3.021	47.62	Pass
C-10	3.011	46.38	Pass
C-11	3.012	46.78	Pass
C-12	3.016	47.83	Pass
C-13	3.010	45.98	Pass
C-14	3.012	46.44	Pass
C-15	3.006	47.01	Pass

B. 50th cycle fully discharged state

C-16	3.121	44.35	Pass
C-17	3.117	47.36	Pass
C-18	3.118	46.35	Pass
C-19	3.131	43.68	Pass
C-20	3.129	44.96	Pass
C-21	3.116	47.46	Pass
C-22	3.127	43.95	Pass
C-23	3.131	46.86	Pass
C-24	3.118	47.68	Pass
C-25	3.127	46.39	Pass

4. Sample Image

