




문서번호	QDI-160307-B-SB10K97575	
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UN38.3 Test Report

- SB10K97575 (Nom.41Wh, 14.6V) -

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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 $1g \leq M \leq 75g$, 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	16.774	230.41	16.764	230.40	99.94	0.004	Pass	16.592	230.39	98.97	0.004	Pass	16.588	230.38	99.98	0.004	Pass	16.578	230.38	99.94	0.000	Pass
2	16.757	229.93	16.754	229.93	99.98	0.000	Pass	16.581	229.91	98.97	0.009	Pass	16.535	229.90	99.72	0.004	Pass	16.528	229.89	99.96	0.004	Pass
3	16.769	230.83	16.761	230.82	99.95	0.004	Pass	16.588	230.82	98.97	0.000	Pass	16.515	230.82	99.56	0.000	Pass	16.502	230.81	99.92	0.004	Pass
4	16.754	230.29	16.740	230.27	99.92	0.009	Pass	16.570	230.26	98.98	0.004	Pass	16.528	230.25	99.75	0.004	Pass	16.521	230.24	99.96	0.004	Pass

B. 50th cycle fully charged state

5	16.757	230.21	16.750	230.20	99.96	0.004	Pass	16.569	230.19	98.92	0.004	Pass	16.519	230.18	99.70	0.004	Pass	16.517	230.17	99.99	0.004	Pass
6	16.748	230.23	16.745	230.22	99.98	0.004	Pass	16.571	230.22	98.96	0.000	Pass	16.565	230.21	99.96	0.004	Pass	16.550	230.20	99.91	0.004	Pass
7	16.754	230.82	16.752	230.81	99.99	0.004	Pass	16.568	230.80	98.90	0.004	Pass	16.555	230.79	99.92	0.004	Pass	16.552	230.78	99.98	0.004	Pass
8	16.742	230.73	16.728	230.73	99.92	0.000	Pass	16.547	230.73	98.92	0.000	Pass	16.538	230.72	99.95	0.004	Pass	16.526	230.71	99.93	0.004	Pass

2-2. T5/T7 Test Result

EXT.Short Circuit (T5)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
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A. 1st cycle fully charged state

1	16.578	56.59	Pass
2	16.528	55.81	Pass
3	16.502	55.76	Pass
4	16.521	55.46	Pass

B. 50th cycle fully charged state

5	16.517	55.32	Pass
6	16.550	55.42	Pass
7	16.552	55.58	Pass
8	16.526	55.89	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
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A. 1st cycle fully charged state

9	16.748	25.28	Pass
10	16.745	23.91	Pass
11	16.743	23.73	Pass
12	16.747	24.15	Pass

Over Charge (T7)

NO.	Initial OCV(V)	Max. Temp (°C)	Result
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B. 50th cycle fully charged state

13	16.728	23.41	Pass
14	16.720	24.50	Pass
15	16.722	24.33	Pass
16	16.729	24.51	Pass

2-3. T6/T8 Test Result (INR18650C4)

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

A. 1st cycle 50% charged state

C-1	3.637	95.14	Pass
C-2	3.638	91.68	Pass
C-3	3.637	92.54	Pass
C-4	3.637	95.23	Pass
C-5	3.635	94.73	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	2.758	77.31	Pass
C-7	2.759	74.63	Pass
C-8	2.757	69.63	Pass
C-9	2.757	77.04	Pass
C-10	2.756	67.83	Pass
C-11	2.758	70.63	Pass
C-12	2.757	72.63	Pass
C-13	2.758	71.88	Pass
C-14	2.757	73.57	Pass
C-15	2.756	65.54	Pass

B. 50th cycle fully discharged state

C-16	2.765	71.83	Pass
C-17	2.767	73.51	Pass
C-18	2.768	70.86	Pass
C-19	2.767	81.03	Pass
C-20	2.764	68.21	Pass
C-21	2.763	78.79	Pass
C-22	2.763	71.60	Pass
C-23	2.769	76.76	Pass
C-24	2.767	76.71	Pass
C-25	2.770	73.69	Pass

3. Sample Image

