

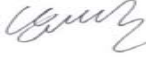


문서번호	QDI-160615-B-SB10K97583	
Prepared	남익현	
Reviewed	우민제	
Approved	남대호	

SolutionPartner

UN38.3 Test Report

- SB10K97583 (Nom.48Wh, 10.8V) -

목 차

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

2016. 06. 15

 **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℃	<ul style="list-style-type: none"> - After OCV (%) ≥ 90% - No leakage, no venting, no disassembly, no rupture, no fire - Mass loss limit (leakage) <ul 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)

2-1. 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	12.571	295.40	12.559	295.38	99.90	0.007	Pass	12.413	295.38	98.84	0.000	Pass	12.314	295.37	99.20	0.003	Pass	12.283	295.36	99.75	0.003	Pass
2	12.543	295.15	12.522	295.14	99.83	0.003	Pass	12.385	295.13	98.91	0.003	Pass	12.295	295.11	99.27	0.007	Pass	12.234	295.10	99.50	0.003	Pass
3	12.541	295.37	12.521	295.36	99.84	0.003	Pass	12.391	295.36	98.96	0.000	Pass	12.283	295.35	99.13	0.003	Pass	12.242	295.34	99.67	0.003	Pass
4	12.540	295.30	12.519	295.30	99.83	0.000	Pass	12.401	295.28	99.06	0.007	Pass	12.285	295.28	99.06	0.000	Pass	12.241	295.27	99.64	0.003	Pass

B. 50th cycle fully charged state

5	12.562	295.92	12.546	295.90	99.87	0.007	Pass	12.418	295.90	98.98	0.000	Pass	12.296	295.89	99.02	0.003	Pass	12.272	295.87	99.80	0.007	Pass
6	12.561	295.55	12.545	295.53	99.87	0.007	Pass	12.409	295.53	98.92	0.000	Pass	12.288	295.52	99.02	0.003	Pass	12.251	295.52	99.70	0.000	Pass
7	12.566	295.72	12.551	295.71	99.88	0.003	Pass	12.413	295.71	98.90	0.000	Pass	12.293	295.71	99.03	0.000	Pass	12.266	295.70	99.78	0.003	Pass
8	12.569	295.92	12.554	295.92	99.88	0.000	Pass	12.415	295.91	98.89	0.003	Pass	12.298	295.90	99.06	0.003	Pass	12.269	295.88	99.76	0.007	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	12.283	55.51	Pass
2	12.234	55.82	Pass
3	12.242	55.41	Pass
4	12.241	54.74	Pass

B. 50th cycle fully charged state

5	12.272	55.83	Pass
6	12.251	55.81	Pass
7	12.266	55.42	Pass
8	12.269	55.18	Pass

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

A. 1st cycle fully charged state

9	12.543	24.77	Pass
10	12.544	24.65	Pass
11	12.545	23.56	Pass
12	12.541	23.78	Pass

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

B. 50th cycle fully charged state

13	12.522	23.74	Pass
14	12.523	23.87	Pass
15	12.521	24.03	Pass
16	12.525	23.69	Pass

2-3. T6/T8 Test Result (ICR18650S3, INR18650S3)

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

A. 1st cycle 50% charged state

C-1	3.647	17.86	Pass
C-2	3.647	18.66	Pass
C-3	3.647	19.22	Pass
C-4	3.647	19.82	Pass
C-5	3.647	19.49	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	3.435	95.86	Pass	C-16	3.435	94.44	Pass
C-7	3.435	91.43	Pass	C-17	3.436	93.95	Pass
C-8	3.436	104.99	Pass	C-18	3.436	98.90	Pass
C-9	3.436	98.50	Pass	C-19	3.435	102.69	Pass
C-10	3.436	93.10	Pass	C-20	3.436	95.74	Pass
C-11	3.437	99.91	Pass	C-21	3.436	95.66	Pass
C-12	3.437	97.06	Pass	C-22	3.436	93.42	Pass
C-13	3.435	97.02	Pass	C-23	3.437	98.34	Pass
C-14	3.436	103.25	Pass	C-24	3.437	96.99	Pass
C-15	3.435	99.42	Pass	C-25	3.436	100.33	Pass

B. 50th cycle fully discharged state

3. Sample Image



Lenovo

Lenovo, ThinkPad is 联想集团所属企业的商标, 根据许可使用。
Rechargeable Li-ion Battery Pack
/ 충전식 리튬 이온 배터리 锂离子电池组
NOM 10.8V 4.4Ah 48Wh
额定容量: 4100mAh 充电限制电压: 12.6V
Model Name:
ASM P/N 型号 SB10K97583
FRU P/N 01AV426 3INR19/66-2