UN38.3 Test Report
- ICR18650B4 (Nom. 2600mAh)-

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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℃	- 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 1 Altitude Simulation ↓ Test 2 Thermal Test ↓ Test 3 Vibration ↓ Test 4 Shock ↓ Test 5 Ext. Short Circuit
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)

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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	4.159	44.540	4.152	44.540	99.83	0.000	Pass	4.093	44.538	98.58	0.004	Pass	4.093	44.538	100.00	0.000	Pass	4.093	44.538	100.00	0.000	Pass
2	4.161	44.554	4.154	44.554	99.83	0.000	Pass	4.035	44.552	97.14	0.004	Pass	4.035	44.551	100.00	0.002	Pass	4.032	44.551	99.93	0.000	Pass
3	4.160	44.562	4.153	44.562	99.83	0.000	Pass	4.094	44.562	98.58	0.000	Pass	4.094	44.560	100.00	0.004	Pass	4.094	44.560	100.00	0.000	Pass
4	4.159	44.551	4.152	44.551	99.83	0.000	Pass	4.094	44.547	98.60	0.009	Pass	4.093	44.547	99.98	0.000	Pass	4.093	44.547	100.00	0.000	Pass
5	4.159	44.537	4.151	44.537	99.81	0.000	Pass	4.092	44.537	98.58	0.000	Pass	4.092	44.537	100.00	0.000	Pass	4.091	44.537	99.98	0.000	Pass
6	4.160	44.555	4.153	44.555	99.83	0.000	Pass	4.094	44.554	98.58	0.002	Pass	4.094	44.554	100.00	0.000	Pass	4.094	44.554	100.00	0.000	Pass
7	4.160	44.536	4.153	44.535	99.83	0.002	Pass	4.094	44.534	98.58	0.002	Pass	4.093	44.534	99.98	0.000	Pass	4.093	44.534	100.00	0.000	Pass
8	4.161	44.570	4.154	44.570	99.83	0.000	Pass	4.094	44.570	98.56	0.000	Pass	4.094	44.570	100.00	0.000	Pass	4.094	44.570	100.00	0.000	Pass
9	4.161	44.591	4.154	44.591	99.83	0.000	Pass	4.095	44.590	98.58	0.002	Pass	4.094	44.590	99.98	0.000	Pass	4.094	44.590	100.00	0.000	Pass
10	4.160	44.549	4.153	44.548	99.83	0.002	Pass	4.094	44.544	98.58	0.009	Pass	4.094	44.544	100.00	0.000	Pass	4.094	44.544	100.00	0.000	Pass

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2-2. T5/T6/T8 Test Result

EXT. Short Circuit (T5)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully charged state			
1	4.093	76.21	Pass
2	4.032	74.85	Pass
3	4.094	78.61	Pass
4	4.093	74.00	Pass
5	4.091	78.44	Pass
6	4.094	74.74	Pass
7	4.093	78.18	Pass
8	4.094	76.79	Pass
9	4.094	72.32	Pass
10	4.094	74.34	Pass

Impact (T6)

NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state			
11	3.623	24.22	Pass
12	3.623	24.59	Pass
13	3.623	24.57	Pass
14	3.597	24.81	Pass
15	3.622	24.61	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			
16	3.428	23.72	Pass	26	3.441	86.85	Pass
17	3.426	22.82	Pass	27	3.441	88.64	Pass
18	3.429	23.24	Pass	28	3.441	88.04	Pass
19	3.429	22.29	Pass	29	3.442	85.60	Pass
20	3.429	24.00	Pass	30	3.440	88.33	Pass
21	3.431	24.52	Pass	31	3.441	86.64	Pass
22	3.431	24.04	Pass	32	3.440	85.76	Pass
23	3.432	24.41	Pass	33	3.442	80.72	Pass
24	3.431	24.22	Pass	34	3.443	86.85	Pass
25	3.428	22.10	Pass	35	3.441	84.93	Pass

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3. Sample Image

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