

문서번호	QDI-160125-B-AC14B18J	
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UN38.3 Test Report

- AC14B18J (Nom. 36.7Wh, 11.31V) -

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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) <ul 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	12.884	169.04	12.880	169.03	99.97	0.006	Pass	12.746	169.03	98.96	0.000	Pass	12.736	169.03	99.92	0.000	Pass	12.726	169.02	99.92	0.006	Pass
2	12.845	169.92	12.838	169.91	99.95	0.006	Pass	12.691	169.91	98.85	0.000	Pass	12.681	169.91	99.92	0.000	Pass	12.671	169.91	99.92	0.000	Pass
3	12.842	169.67	12.841	169.67	99.99	0.000	Pass	12.703	169.67	98.93	0.000	Pass	12.694	169.67	99.93	0.000	Pass	12.684	169.67	99.92	0.000	Pass
4	12.853	169.45	12.846	169.44	99.95	0.006	Pass	12.714	169.44	98.97	0.000	Pass	12.706	169.44	99.94	0.000	Pass	12.696	169.44	99.92	0.000	Pass

B. 50th cycle fully charged state

5	12.865	169.21	12.855	169.20	99.92	0.006	Pass	12.714	169.19	98.90	0.006	Pass	12.594	169.19	99.06	0.000	Pass	12.577	169.18	99.87	0.006	Pass
6	12.852	169.53	12.842	169.52	99.92	0.006	Pass	12.700	169.52	98.89	0.000	Pass	12.581	169.52	99.06	0.000	Pass	12.577	169.52	99.97	0.000	Pass
7	12.851	169.21	12.841	169.20	99.92	0.006	Pass	12.692	169.19	98.84	0.006	Pass	12.590	169.18	99.20	0.006	Pass	12.585	169.17	99.96	0.006	Pass
8	12.856	169.93	12.846	169.93	99.92	0.000	Pass	12.697	169.92	98.84	0.006	Pass	12.587	169.91	99.13	0.006	Pass	12.577	169.90	99.92	0.006	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	12.726	55.75	Pass
2	12.671	55.36	Pass
3	12.684	56.96	Pass
4	12.696	56.03	Pass

B. 50th cycle fully charged state

5	12.577	57.76	Pass
6	12.577	56.84	Pass
7	12.585	56.93	Pass
8	12.577	57.75	Pass

Over Charge (T7)

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

9	12.647	25.46	Pass
10	12.649	24.67	Pass
11	12.646	24.90	Pass
12	12.645	24.35	Pass

Over Charge (T7)

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

13	12.627	25.29	Pass
14	12.621	25.36	Pass
15	12.624	25.44	Pass
16	12.628	25.43	Pass

2-3. T6/T8 Test Result (ICP485780B2)

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

A. 1st cycle 50% charged state

C-1	3.816	19.48	Pass
C-2	3.816	19.55	Pass
C-3	3.815	19.36	Pass
C-4	3.815	19.42	Pass
C-5	3.817	20.07	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	3.021	54.97	Pass
C-7	3.053	55.21	Pass
C-8	3.069	51.11	Pass
C-9	3.109	56.64	Pass
C-10	3.058	58.43	Pass
C-11	3.017	55.31	Pass
C-12	3.082	50.38	Pass
C-13	3.015	57.33	Pass
C-14	3.021	50.56	Pass
C-15	3.065	58.43	Pass

B. 50th cycle fully discharged state

C-16	3.213	67.88	Pass
C-17	3.205	73.31	Pass
C-18	3.224	65.52	Pass
C-19	3.221	67.11	Pass
C-20	3.198	50.02	Pass
C-21	3.206	61.40	Pass
C-22	3.199	74.44	Pass
C-23	3.233	71.08	Pass
C-24	3.217	70.23	Pass
C-25	3.197	69.87	Pass

