




문서번호	QAE-EF02-151118-SB-GV30	
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UN38.3 Test Report

- GV30 (Min.9.4Wh, 3.8V) -

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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 1g) 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	4.367	40.074	4.366	40.074	99.98	0.000	Pass	4.315	40.072	98.83	0.005	Pass	4.313	40.072	99.95	0.000	Pass	4.311	40.072	99.95	0.000	Pass
2	4.366	40.056	4.365	40.055	99.98	0.002	Pass	4.314	40.052	98.83	0.007	Pass	4.312	40.048	99.95	0.010	Pass	4.310	40.048	99.95	0.000	Pass
3	4.367	40.062	4.366	40.062	99.98	0.000	Pass	4.315	40.058	98.83	0.010	Pass	4.314	40.054	99.98	0.010	Pass	4.312	40.054	99.95	0.000	Pass
4	4.365	40.055	4.363	40.055	99.95	0.000	Pass	4.316	40.051	98.92	0.010	Pass	4.315	40.050	99.98	0.002	Pass	4.313	40.049	99.95	0.002	Pass
5	4.366	40.073	4.365	40.073	99.98	0.000	Pass	4.316	40.069	98.88	0.010	Pass	4.313	40.066	99.93	0.007	Pass	4.311	40.066	99.95	0.000	Pass
6	4.367	40.065	4.366	40.065	99.98	0.000	Pass	4.314	40.063	98.81	0.005	Pass	4.311	40.062	99.93	0.002	Pass	4.310	40.061	99.98	0.002	Pass
7	4.368	40.035	4.367	40.035	99.98	0.000	Pass	4.316	40.033	98.83	0.005	Pass	4.313	40.032	99.93	0.002	Pass	4.311	40.030	99.95	0.005	Pass
8	4.364	40.029	4.363	40.028	99.98	0.002	Pass	4.315	40.026	98.90	0.005	Pass	4.314	40.024	99.98	0.005	Pass	4.312	40.024	99.95	0.000	Pass
9	4.366	40.040	4.365	40.040	99.98	0.000	Pass	4.316	40.035	98.88	0.011	Pass	4.313	40.032	99.93	0.007	Pass	4.310	40.032	99.93	0.000	Pass
10	4.365	40.032	4.364	40.031	99.98	0.002	Pass	4.313	40.027	98.83	0.010	Pass	4.312	40.026	99.98	0.002	Pass	4.310	40.025	99.95	0.002	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	4.311	53.15	Pass
2	4.310	51.90	Pass
3	4.312	54.22	Pass
4	4.313	53.22	Pass
5	4.311	52.11	Pass
6	4.310	54.88	Pass
7	4.311	53.78	Pass
8	4.312	54.24	Pass
9	4.310	53.01	Pass
10	4.310	54.09	Pass

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

A. 1st cycle fully charged state

11	4.364	23.12	Pass
12	4.365	24.25	Pass
13	4.366	23.60	Pass
14	4.365	23.22	Pass

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

B. 50th cycle fully charged state

15	4.363	23.65	Pass
16	4.364	24.66	Pass
17	4.363	23.45	Pass
18	4.362	22.21	Pass

2-3. T6/T8 Test Result (ICP346674L1)

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

A. 1st cycle 50% charged state

C-1	3.885	24.23	Pass
C-2	3.879	23.32	Pass
C-3	3.884	23.64	Pass
C-4	3.886	24.44	Pass
C-5	3.884	25.95	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	48.49	Pass
C-7	3.010	49.64	Pass
C-8	3.014	47.25	Pass
C-9	3.008	49.65	Pass
C-10	3.006	48.85	Pass
C-11	3.005	47.49	Pass
C-12	3.012	46.94	Pass
C-13	3.014	48.68	Pass
C-14	3.015	48.33	Pass
C-15	3.011	45.49	Pass

B. 50th cycle fully discharged state

C-16	3.136	46.35	Pass
C-17	3.123	45.78	Pass
C-18	3.122	46.49	Pass
C-19	3.128	46.27	Pass
C-20	3.116	47.78	Pass
C-21	3.123	48.49	Pass
C-22	3.111	47.69	Pass
C-23	3.127	47.84	Pass
C-24	3.132	49.99	Pass
C-25	3.134	46.74	Pass

3. Sample Image

