




문서번호	QAE-EF02-140102-PO355773B1	
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UN Test Report

-ICP355773B1 (Min. 2170mAh)-

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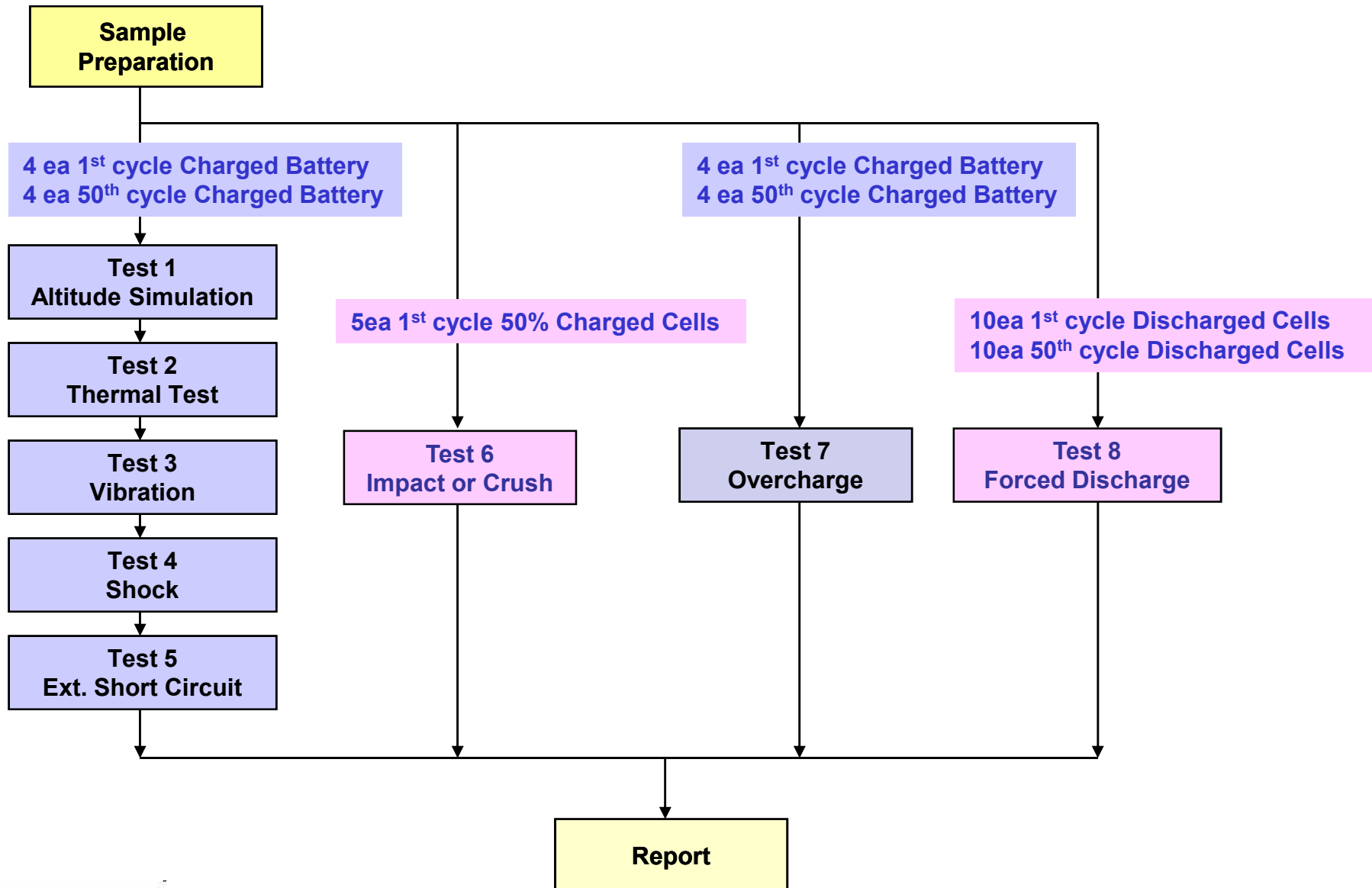
1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure) 11.6kPa for 6hr at 20+/-5℃	- Measuring mass before/ after each test (If M<1g, less than 0.5%, If 1g≤M≤75g, less than 0.2%, If M>75g, less than 0.1%) - Measuring voltage before/ after each test (more than 90%) - No leakage, no venting, no disassembly, no rupture, no fire
Test 2. Thermal Test	[72±2℃, 6hr ↔ -40±2℃, 6hr, interval max. 30min] x 10 cycle 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	- No disassembly, no rupture, no fire within 6 hours after the test - Temp. monitoring (max. 170℃)
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 fire within 6 hours after the test - Temp. monitoring (max. 170℃)
Test 6. Impact for cylindrical cells (> 20mm diameter)	Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height	
Test 6. Crush for cylindrical cells (≤ 20mm diameter) for prismatic, pouch, coin/button cells	Crushing rate : 1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation	- No disassembly, no fire within 7 days after the test
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 V (min.) = 22V. 2.If charge voltage > 18V, V (min.) = 1.2 x (max. charge voltage)	
Test 8. Forced Discharge	Discharge at max. discharge current (with 12V DC power supply), Duration time = rated capacity/initial test current	

* Tests through T1-T5 shall be conducted in sequence with the same battery.

* We declare that the above-mentioned test is the result of being checked according to UN Test
(Manual of Test and Criteria ST/SG/AC.10/11/Rev.5/Amd.1)

2. Test Procedure



3-1. T1-T4 Test Result

Before			Altitude (T1)					Thermal (T2)					Vibration (T3)					Shock (T4)				
Pack NO.	OCV	Mass	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result	OCV	Mass	Residual OCV(%)	Mass Loss(%)	Result

A. 1st cycle fully charge state

1	4.324	33.363	4.322	33.360	99.95	0.009	Pass	4.260	33.357	98.57	0.009	Pass	4.258	33.354	99.95	0.009	Pass	4.258	33.350	100.00	0.012	Pass
2	4.323	33.397	4.321	33.393	99.95	0.012	Pass	4.259	33.388	98.57	0.015	Pass	4.258	33.384	99.98	0.012	Pass	4.257	33.384	99.98	0.000	Pass
3	4.323	33.394	4.321	33.393	99.95	0.003	Pass	4.259	33.387	98.57	0.018	Pass	4.258	33.386	99.98	0.003	Pass	4.257	33.382	99.98	0.012	Pass
4	4.325	33.403	4.323	33.400	99.95	0.009	Pass	4.260	33.391	98.54	0.027	Pass	4.259	33.391	99.98	0.000	Pass	4.259	33.389	100.00	0.006	Pass
5	4.322	33.431	4.320	33.429	99.95	0.006	Pass	4.259	33.422	98.59	0.021	Pass	4.257	33.420	99.95	0.006	Pass	4.257	33.418	100.00	0.006	Pass
6	4.324	33.374	4.321	33.374	99.93	0.000	Pass	4.260	33.368	98.59	0.018	Pass	4.258	33.368	99.95	0.000	Pass	4.258	33.365	100.00	0.009	Pass
7	4.324	33.367	4.322	33.366	99.95	0.003	Pass	4.260	33.358	98.57	0.024	Pass	4.258	33.357	99.95	0.003	Pass	4.258	33.357	100.00	0.000	Pass
8	4.323	33.473	4.321	33.472	99.95	0.003	Pass	4.259	33.465	98.57	0.021	Pass	4.258	33.463	99.98	0.006	Pass	4.258	33.460	100.00	0.009	Pass
9	4.325	33.365	4.323	33.362	99.95	0.009	Pass	4.261	33.355	98.57	0.021	Pass	4.259	33.355	99.95	0.000	Pass	4.259	33.351	100.00	0.012	Pass
10	4.324	33.379	4.322	33.377	99.95	0.006	Pass	4.260	33.371	98.57	0.018	Pass	4.259	33.369	99.98	0.006	Pass	4.258	33.366	99.98	0.009	Pass
Ave.	4.324	33.395	4.322	33.393	99.95	0.006	-	4.260	33.386	98.57	0.019	-	4.258	33.385	99.96	0.004	-	4.258	33.382	99.99	0.007	-

Requirement	<ul style="list-style-type: none"> - Measuring mass before/after each test (If $M > 75g$, less than 0.1%, $1g \leq M \leq 75$, less than 0.2%, $M < 1g$, less than 0.5%) - Measuring voltage before/after each test (more than 90%, only charged samples) - No leakage, no venting, no disassembly, no rupture, no fire
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3-2. T5/T6/T8 Test Result

EXT.Short Circuit (T5)			
Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result
A. 1st cycle fully charged state			
1	4.258	96.10	Pass
2	4.257	100.34	Pass
3	4.257	102.63	Pass
4	4.259	103.46	Pass
5	4.257	100.09	Pass
6	4.258	95.34	Pass
7	4.258	102.12	Pass
8	4.258	100.68	Pass
9	4.259	102.47	Pass
10	4.258	103.54	Pass
MAX.	4.259	103.54	-

Test Condition
- 100mΩ ext. short-circuit at 55±2°C

Requirement
- Temperature < 170 (°C) - No disassembly, no rupture, no fire within 6 hours after the test

Crush (T6)				
	Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result
A. 1st cycle 50% charged state (Direction :Flat)				
	1	3.844	25.14	Pass
	2	3.840	25.22	Pass
Flat	3	3.838	25.67	Pass
	4	3.844	25.17	Pass
	5	3.844	24.86	Pass
MAX.		3.844	25.67	-

Test Condition
- Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation

Requirement
- Temperature ≤ 170 (°C) - No disassembly, no fire within 6 hours after the test

Forced Discharge (T8)			
Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result
A. 1st cycle fully Discharged state			
1	3.345	84.64	Pass
2	3.337	81.92	Pass
3	3.355	87.13	Pass
4	3.359	97.94	Pass
5	3.333	83.77	Pass
6	3.321	90.18	Pass
7	3.345	83.29	Pass
8	3.332	86.77	Pass
9	3.347	82.37	Pass
10	3.354	81.08	Pass
MAX.	3.359	97.94	-

B. 50th cycle fully discharged state			
1	3.653	81.73	Pass
2	3.677	85.71	Pass
3	3.685	83.17	Pass
4	3.693	83.47	Pass
5	3.679	80.13	Pass
6	3.695	83.61	Pass
7	3.628	95.65	Pass
8	3.638	90.72	Pass
9	3.634	85.35	Pass
10	3.674	81.73	Pass
MAX.	3.695	95.65	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 2150mA Duration time: rated capacity (60.6min)

Requirement
- No disassembly, no fire within 7 days after the test

4. Sample Image

