




문서번호	QAE-EF02-150728-PKP/N SB10J78989	
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UN Test Report

-SB10J78989(Nom. 47Wh, 11.4V)-

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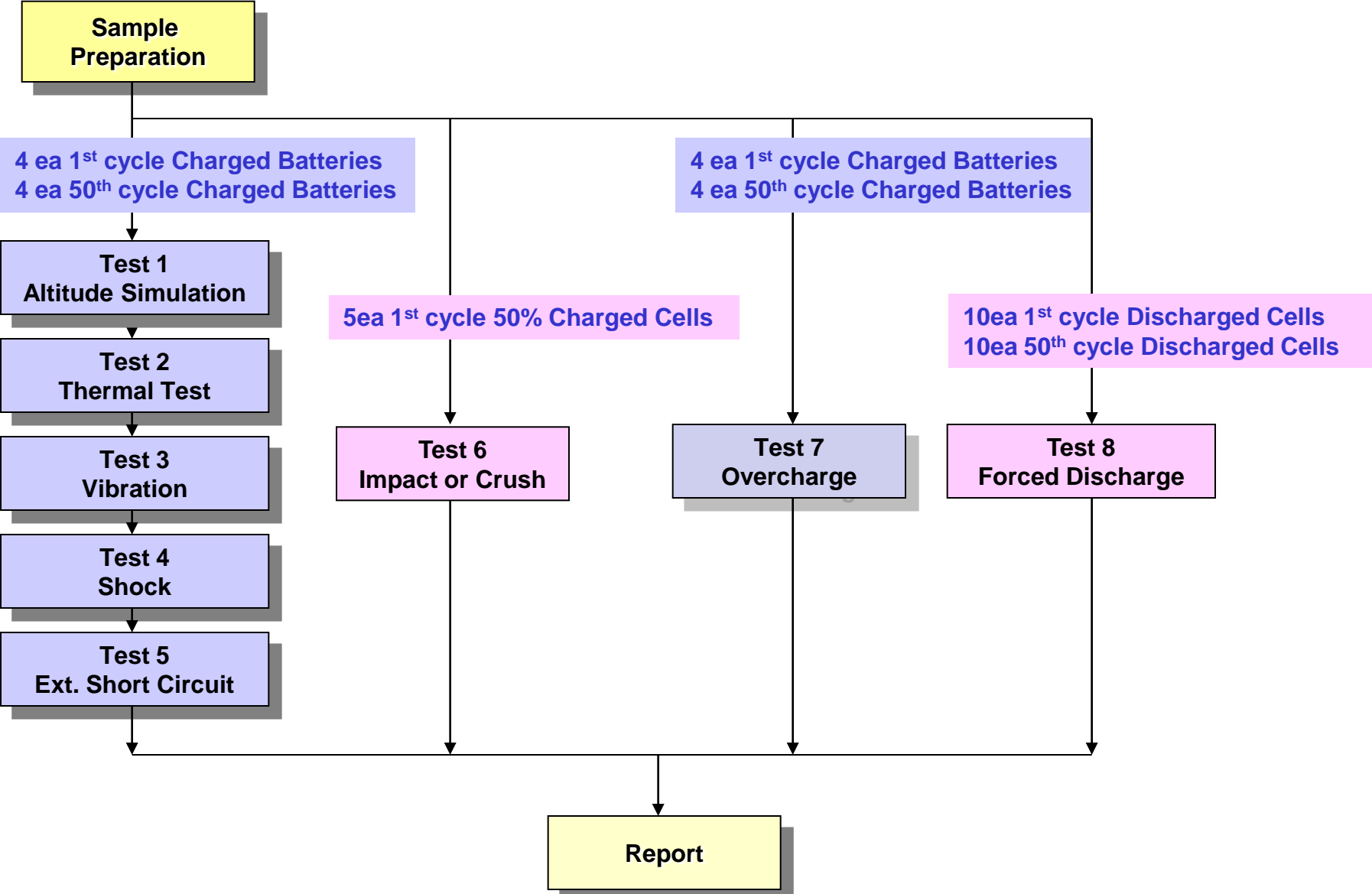
1. UN Transportation Regulation Test

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 $1g \leq M \leq 75g$, 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 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 for cylindrical cells (> 18mm diameter)	Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height	- No disassembly, no fire within 6 hours after the test - Temp. monitoring (max. 170℃)
Test 6. Crush for cylindrical cells (≤ 18mm diameter) for prismatic, pouch, coin/button cells	Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation	
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)	- No disassembly, no fire within 7 days after the test
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 samples.

* 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.2)

2. Test Procedure



3-1. T1-T4 Test Result

Before			Altitude (T1)					Thermal (T2)					Vibration (T3)					Shock (T4)				
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 charged state

Charge	1	12.888	248.30	12.875	248.28	99.90	0.008	Pass	12.725	248.27	98.83	0.004	Pass	12.723	248.26	99.98	0.004	Pass	12.720	248.26	99.98	0.002	Pass
	2	12.859	248.18	12.837	248.17	99.83	0.004	Pass	12.682	248.17	98.79	0.000	Pass	12.680	248.15	99.98	0.008	Pass	12.673	248.14	99.94	0.004	Pass
	3	12.846	248.99	12.842	248.97	99.97	0.008	Pass	12.698	248.97	98.88	0.000	Pass	12.687	248.96	99.91	0.004	Pass	12.675	248.95	99.91	0.004	Pass
	4	12.858	248.83	12.849	248.82	99.93	0.004	Pass	12.687	248.80	98.74	0.008	Pass	12.675	248.78	99.91	0.008	Pass	12.670	248.78	99.96	0.000	Pass
	Ave.	12.863	248.58	12.851	248.56	99.91	0.006	-	12.698	248.55	98.81	0.003	-	12.691	248.54	99.95	0.006	-	12.685	248.53	99.95	0.002	-

B. 50th cycle fully charged state

Charge	5	12.858	248.34	12.853	248.33	99.96	0.004	Pass	12.706	248.32	98.86	0.004	Pass	12.696	248.31	99.92	0.004	Pass	12.691	248.31	99.96	0.000	Pass
	6	12.855	248.58	12.853	248.56	99.98	0.008	Pass	12.709	248.54	98.88	0.008	Pass	12.698	248.52	99.91	0.008	Pass	12.688	248.51	99.92	0.004	Pass
	7	12.855	248.82	12.843	248.82	99.91	0.000	Pass	12.696	248.80	98.86	0.008	Pass	12.686	248.80	99.92	0.000	Pass	12.676	248.79	99.92	0.004	Pass
	8	12.861	248.20	12.859	248.19	99.98	0.004	Pass	12.704	248.19	98.79	0.000	Pass	12.695	248.17	99.93	0.008	Pass	12.684	248.16	99.91	0.004	Pass
	Ave.	12.857	248.49	12.852	248.48	99.96	0.004	-	12.704	248.46	98.85	0.005	-	12.694	248.45	99.92	0.005	-	12.685	248.44	99.93	0.003	-

Requirement

- 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

3-2. 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

Charge	1	12.720	55.84	Pass
	2	12.673	56.53	Pass
	3	12.675	56.21	Pass
	4	12.670	55.27	Pass
	MAX.	12.720	56.53	-

Test Condition

- 100mΩ ext. short-circuit at 55±2°C

Over Charge (T7)

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

Charge	9	12.846	25.18	Pass
	10	12.841	24.77	Pass
	11	12.843	24.38	Pass
	12	12.840	23.42	Pass
	MAX.	12.846	25.18	-

Test Condition

- Max. Charge Current : 2010mA
 - CC/CV 2I_{max}(4020mA) 22.0V cut-off 24Hr

EXT.Short Circuit (T5)

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

Charge	5	12.691	55.42	Pass
	6	12.688	55.06	Pass
	7	12.676	56.48	Pass
	8	12.684	56.32	Pass
	MAX.	12.691	56.48	-

Requirement

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

Over Charge (T7)

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

Charge	13	12.825	24.00	Pass
	14	12.827	24.06	Pass
	15	12.827	24.82	Pass
	16	12.823	24.29	Pass
	MAX.	12.827	24.82	-

Requirement

- No disassembly, no fire within 7 day after the test

3-3. T6/T8 Test Result (ICP653864L1)

Crush (T6)

Direction	NO.	Initial OCV(V)	Max. Temp (°C)	Result
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A. 1st cycle 50% charged state

Flat	C-1	3.803	22.71	Pass
	C-2	3.791	23.74	Pass
	C-3	3.798	23.13	Pass
	C-4	3.788	23.49	Pass
	C-5	3.806	23.59	Pass
MAX.		3.806	23.74	-

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)

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

C-6	3.001	46.41	Pass
C-7	3.007	48.90	Pass
C-8	2.978	46.80	Pass
C-9	2.979	49.04	Pass
C-10	2.979	47.18	Pass
C-11	2.985	49.27	Pass
C-12	3.009	48.11	Pass
C-13	2.979	48.30	Pass
C-14	3.011	46.83	Pass
C-15	2.980	47.64	Pass
MAX.	3.011	49.27	-

B. 50th cycle fully discharged state

C-16	3.144	45.57	Pass
C-17	3.142	45.37	Pass
C-18	3.141	45.35	Pass
C-19	3.142	46.11	Pass
C-20	3.139	44.59	Pass
C-21	3.139	45.62	Pass
C-22	3.137	46.28	Pass
C-23	3.137	44.44	Pass
C-24	3.139	44.66	Pass
C-25	3.141	44.64	Pass
MAX.	3.144	46.28	-

Test Condition

- Discharge at max. discharge current (with 12V DC power supply) 3015mA
Duration time: rated capacity (40min)

Requirement

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

4. Sample Image

