




문서번호	QAE-EF02-15821-PKLBP7221E	
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UN Test Report

- SB10J78997 (Nom.42Wh, 11.4V) -

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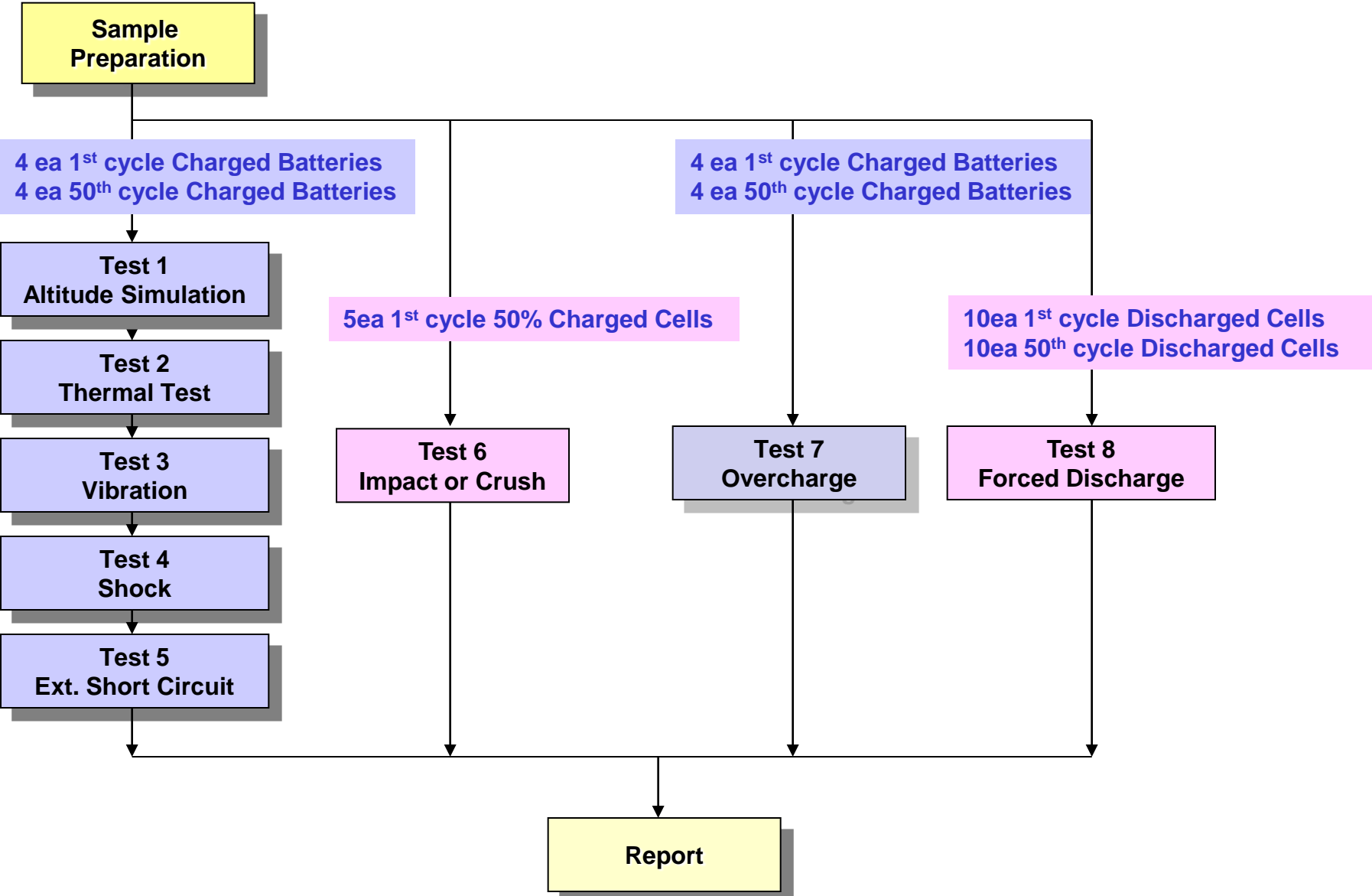
1. UN Transportation Regulation Test

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	12.696	189.95	12.691	189.95	99.96	0.000	Pass	12.530	189.94	98.73	0.005	Pass	12.524	189.94	99.95	0.000	Pass	12.520	189.93	99.97	0.005	Pass
	2	12.690	189.97	12.689	189.97	99.99	0.000	Pass	12.534	189.95	98.78	0.011	Pass	12.531	189.94	99.98	0.005	Pass	12.527	189.94	99.97	0.000	Pass
	3	12.694	189.95	12.688	189.94	99.95	0.005	Pass	12.522	189.92	98.69	0.011	Pass	12.518	189.90	99.97	0.011	Pass	12.517	189.89	99.99	0.005	Pass
	4	12.692	189.98	12.692	189.98	100.00	0.000	Pass	12.522	189.97	98.66	0.005	Pass	12.517	189.96	99.96	0.005	Pass	12.512	189.96	99.96	0.000	Pass
	Ave.	12.693	189.96	12.690	189.96	99.98	0.001	-	12.527	189.95	98.72	0.008	-	12.523	189.94	99.96	0.005	-	12.519	189.93	99.97	0.003	-

B. 50th cycle fully charged state

Charge	5	12.680	189.97	12.676	189.97	99.97	0.000	Pass	12.507	189.97	98.67	0.000	Pass	12.504	189.95	99.98	0.011	Pass	12.501	189.94	99.98	0.005	Pass
	6	12.671	189.96	12.665	189.94	99.95	0.011	Pass	12.513	189.93	98.80	0.005	Pass	12.507	189.91	99.95	0.011	Pass	12.506	189.90	99.99	0.005	Pass
	7	12.698	189.93	12.695	189.92	99.98	0.005	Pass	12.544	189.90	98.81	0.011	Pass	12.540	189.89	99.97	0.005	Pass	12.537	189.89	99.98	0.000	Pass
	8	12.678	189.92	12.673	189.92	99.96	0.000	Pass	12.502	189.91	98.65	0.005	Pass	12.498	189.89	99.97	0.011	Pass	12.492	189.88	99.95	0.005	Pass
	Ave.	12.682	189.95	12.677	189.94	99.96	0.004	-	12.517	189.93	98.73	0.005	-	12.512	189.91	99.97	0.009	-	12.509	189.90	99.97	0.004	-

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	12.520	56.44	Pass
	2	12.527	56.72	Pass
	3	12.517	56.53	Pass
	4	12.512	57.00	Pass
	MAX.	12.527	57.00	-

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	12.691	25.48	Pass
	10	12.692	24.72	Pass
	11	12.691	26.09	Pass
	12	12.691	25.85	Pass
	MAX.	12.692	26.09	-

Test Condition

- Max. Charge Current : 3630mA
 - CC/CV 2Imax(7260mA) 22V 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	12.501	56.91	Pass
	6	12.506	56.43	Pass
	7	12.537	56.60	Pass
	8	12.492	56.89	Pass
	MAX.	12.537	56.91	-

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	12.678	24.93	Pass
	14	12.675	24.35	Pass
	15	12.674	24.80	Pass
	16	12.674	25.81	Pass
	MAX.	12.678	25.81	-

Requirement

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

3-3. T6/T8 Test Result (ICP485490L1)

Crush (T6)

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

Flat	C-1	3.849	23.44	Pass
	C-2	3.853	23.49	Pass
	C-3	3.847	23.38	Pass
	C-4	3.854	23.47	Pass
	C-5	3.850	23.43	Pass
MAX.		3.854	23.49	-

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	3.012	47.56	Pass
C-7	3.007	46.43	Pass
C-8	3.010	47.48	Pass
C-9	3.011	48.55	Pass
C-10	3.017	47.54	Pass
C-11	3.011	47.30	Pass
C-12	3.014	46.59	Pass
C-13	3.009	45.37	Pass
C-14	3.013	45.11	Pass
C-15	3.012	47.08	Pass
MAX.	3.017	48.55	-

B. 50th cycle fully discharged state

C-16	3.115	43.46	Pass
C-17	3.117	46.52	Pass
C-18	3.121	46.80	Pass
C-19	3.130	43.24	Pass
C-20	3.127	44.67	Pass
C-21	3.113	47.32	Pass
C-22	3.125	43.17	Pass
C-23	3.118	44.28	Pass
C-24	3.117	45.14	Pass
C-25	3.124	44.30	Pass
MAX.	3.130	47.32	-

Test Condition

- Discharge at max. discharge current
(with 12V DC power supply) : 3630mA
Duration time: rated capacity (60min)

Requirement

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

4. Sample Image

