




문서번호	QAE-EF02-140325-PKASM P/N SB10F46440	
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UN Test Report

- ASM P/N SB10F46440(Nom.51Wh, 15.2V)-

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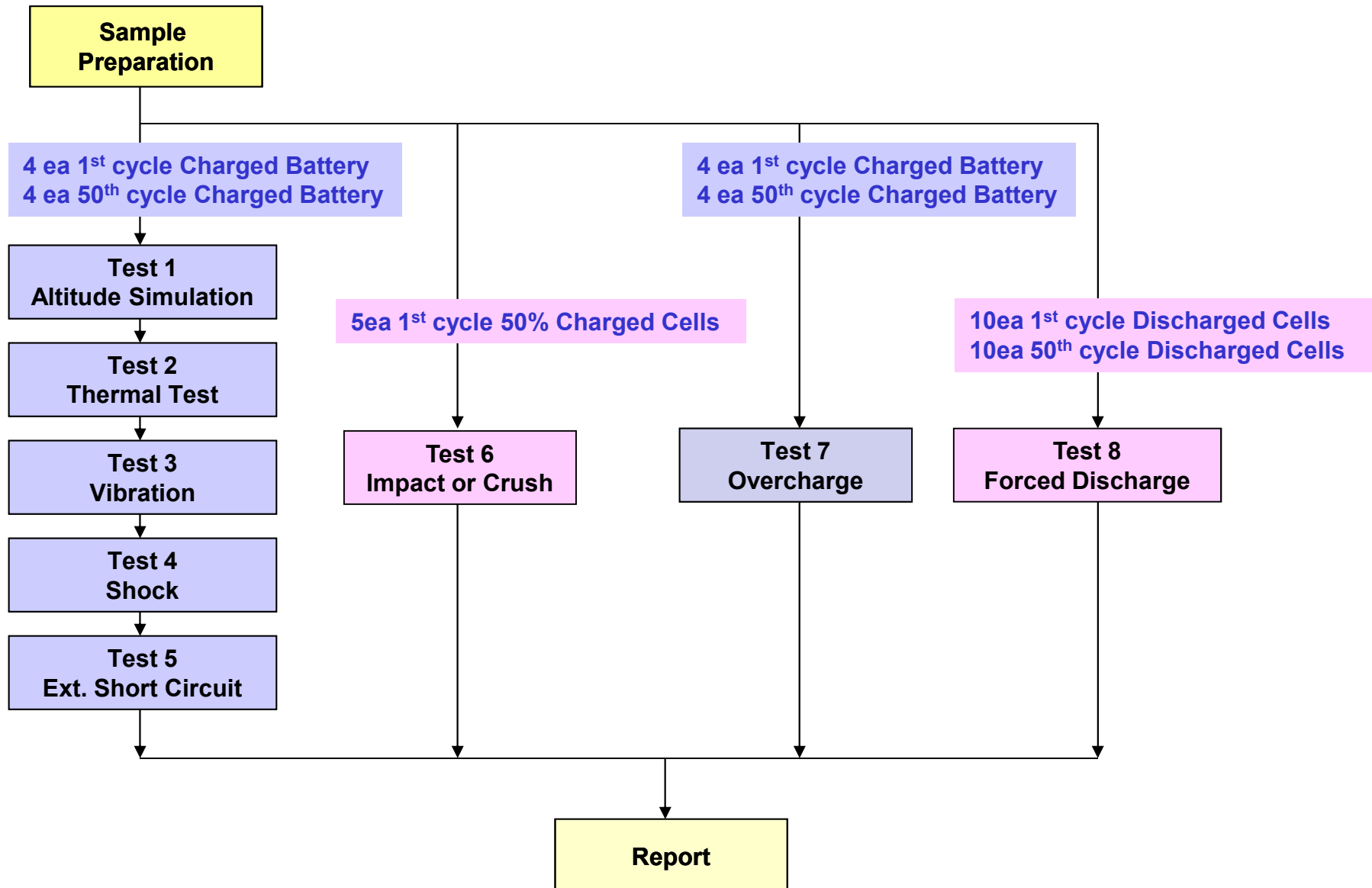
1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure) 11.6kPa for 6hr at 20+/-5 °C	- 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 °C, 6hr ↔ -40 ± 2 °C, 6hr, interval max. 30min] x 10 cycle Storing at 20±5 °C 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 °C 1hr continue after returning at 55±2 °C	
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 °C)
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 state

Charge	1	17.304	242.52	17.304	242.52	100.00	0.000	Pass	17.104	242.49	98.84	0.012	Pass	17.103	242.47	99.99	0.008	Pass	17.102	242.45	99.99	0.008	Pass
	2	17.308	242.55	17.304	242.52	99.98	0.012	Pass	17.108	242.52	98.87	0.000	Pass	17.107	242.51	99.99	0.004	Pass	17.104	242.49	99.98	0.008	Pass
	3	17.304	242.52	17.303	242.49	99.99	0.012	Pass	17.108	242.46	98.87	0.012	Pass	17.104	242.43	99.98	0.012	Pass	17.100	242.42	99.98	0.004	Pass
	4	17.304	242.58	17.303	242.58	99.99	0.000	Pass	17.112	242.55	98.90	0.012	Pass	17.111	242.52	99.99	0.012	Pass	17.100	242.51	99.94	0.004	Pass
	Ave.	17.305	242.54	17.304	242.53	99.99	0.006	-	17.108	242.51	98.87	0.009	-	17.106	242.48	99.99	0.009	-	17.102	242.47	99.97	0.006	-

B. 50th cycle fully state

Charge	5	17.288	242.58	17.284	242.56	99.98	0.008	Pass	17.088	242.55	98.87	0.004	Pass	17.087	242.53	99.99	0.008	Pass	17.084	242.52	99.98	0.004	Pass
	6	17.288	242.55	17.284	242.54	99.98	0.004	Pass	17.084	242.52	98.84	0.008	Pass	17.080	242.50	99.98	0.008	Pass	17.080	242.49	100.00	0.004	Pass
	7	17.292	242.49	17.292	242.46	100.00	0.012	Pass	17.088	242.46	98.82	0.000	Pass	17.084	242.45	99.98	0.004	Pass	17.083	242.43	99.99	0.008	Pass
	8	17.284	242.46	17.280	242.43	99.98	0.012	Pass	17.080	242.40	98.84	0.012	Pass	17.075	242.38	99.97	0.008	Pass	17.074	242.37	99.99	0.004	Pass
	Ave.	17.288	242.52	17.285	242.50	99.98	0.009	-	17.085	242.48	98.84	0.006	-	17.082	242.47	99.98	0.007	-	17.080	242.45	99.99	0.005	-

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

A. 1st cycle fully state

Charge	1	17.102	55.07	Pass
	2	17.104	55.20	Pass
	3	17.100	55.70	Pass
	4	17.100	55.69	Pass
	MAX.	17.104	55.70	-

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

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

A. 1st cycle fully state

Charge	9	17.300	22.03	Pass
	10	17.300	22.75	Pass
	11	17.304	22.41	Pass
	12	17.304	22.28	Pass
	MAX.	17.304	22.75	-

Test Condition
- Max. Charge Current : 3304mA - CC/CV 2Imax(6608mA) 22V cut-off 24Hr

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (°C)	Result

B. 50th cycle fully state

Charge	5	17.084	55.29	Pass
	6	17.080	55.85	Pass
	7	17.083	55.23	Pass
	8	17.074	55.27	Pass
	MAX.	17.084	55.85	-

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

B. 50th cycle fully state

Charge	13	17.288	22.68	Pass
	14	17.284	22.05	Pass
	15	17.284	22.04	Pass
	16	17.288	22.74	Pass
	MAX.	17.288	22.74	-

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

3-3. T6/T8 Test Result (ICP443867L1)

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

A. 1st cycle 50% charged state (Direction : Flat)

Flat	C-1	3.824	22.68	Pass
	C-2	3.823	22.73	Pass
	C-3	3.823	23.65	Pass
	C-4	3.824	22.95	Pass
	C-5	3.824	22.06	Pass
MAX.		3.824	23.65	-

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

A. 1st cycle fully Discharged state

C-6	3.415	84.25	Pass
C-7	3.411	83.68	Pass
C-8	3.406	81.25	Pass
C-9	3.414	84.95	Pass
C-10	3.413	83.77	Pass
C-11	3.419	78.46	Pass
C-12	3.406	82.85	Pass
C-13	3.409	86.84	Pass
C-14	3.406	80.46	Pass
C-15	3.418	85.85	Pass
MAX.	3.419	85.85	-

B. 50th cycle fully discharged state

C-16	3.485	92.84	Pass
C-17	3.479	88.19	Pass
C-18	3.481	86.58	Pass
C-19	3.475	84.84	Pass
C-20	3.492	90.26	Pass
C-21	3.480	87.15	Pass
C-22	3.475	91.12	Pass
C-23	3.473	86.95	Pass
C-24	3.483	93.53	Pass
C-25	3.479	86.07	Pass
MAX.	3.492	93.53	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 1530mA Duration time: rated capacity (60.0min)

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

3-4. T6/T8 Test Result (ICP385757L1)

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

A. 1st cycle 50% charged state (Direction : Flat)

Flat	C-1	3.824	23.94	Pass
	C-2	3.824	23.48	Pass
	C-3	3.824	23.43	Pass
	C-4	3.824	24.44	Pass
	C-5	3.824	23.81	Pass
MAX.		3.824	24.44	-

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

A. 1st cycle fully Discharged state

C-6	3.504	46.90	Pass
C-7	3.383	47.27	Pass
C-8	3.282	47.99	Pass
C-9	3.361	46.25	Pass
C-10	3.331	48.58	Pass
C-11	3.336	46.37	Pass
C-12	3.410	46.62	Pass
C-13	3.448	48.40	Pass
C-14	3.617	47.38	Pass
C-15	3.590	48.35	Pass
MAX.	3.617	48.58	-

B. 50th cycle fully discharged state

C-16	3.465	48.32	Pass
C-17	3.467	49.87	Pass
C-18	3.467	48.05	Pass
C-19	3.472	48.35	Pass
C-20	3.470	47.35	Pass
C-21	3.480	50.12	Pass
C-22	3.458	49.15	Pass
C-23	3.468	48.96	Pass
C-24	3.474	50.36	Pass
C-25	3.482	50.21	Pass
MAX.	3.482	50.36	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 1720mA Duration time: rated capacity (60.0min)

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

4. Sample Image

