




문서번호	QAE-EF02-140325-PKASM P/N SB10F46444	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	박해나	
Approved	김병수	

**SolutionPartner**

# UN Test Report

## - ASM P/N SB10F46444(Nom.27Wh, 7.4V) -

### 목 차

1. UN Transportation Regulation Test
  2. Test Procedure
  3. Test Result
  4. Sample Image
- Appendix. Drop Test Report

2014. 03. 25



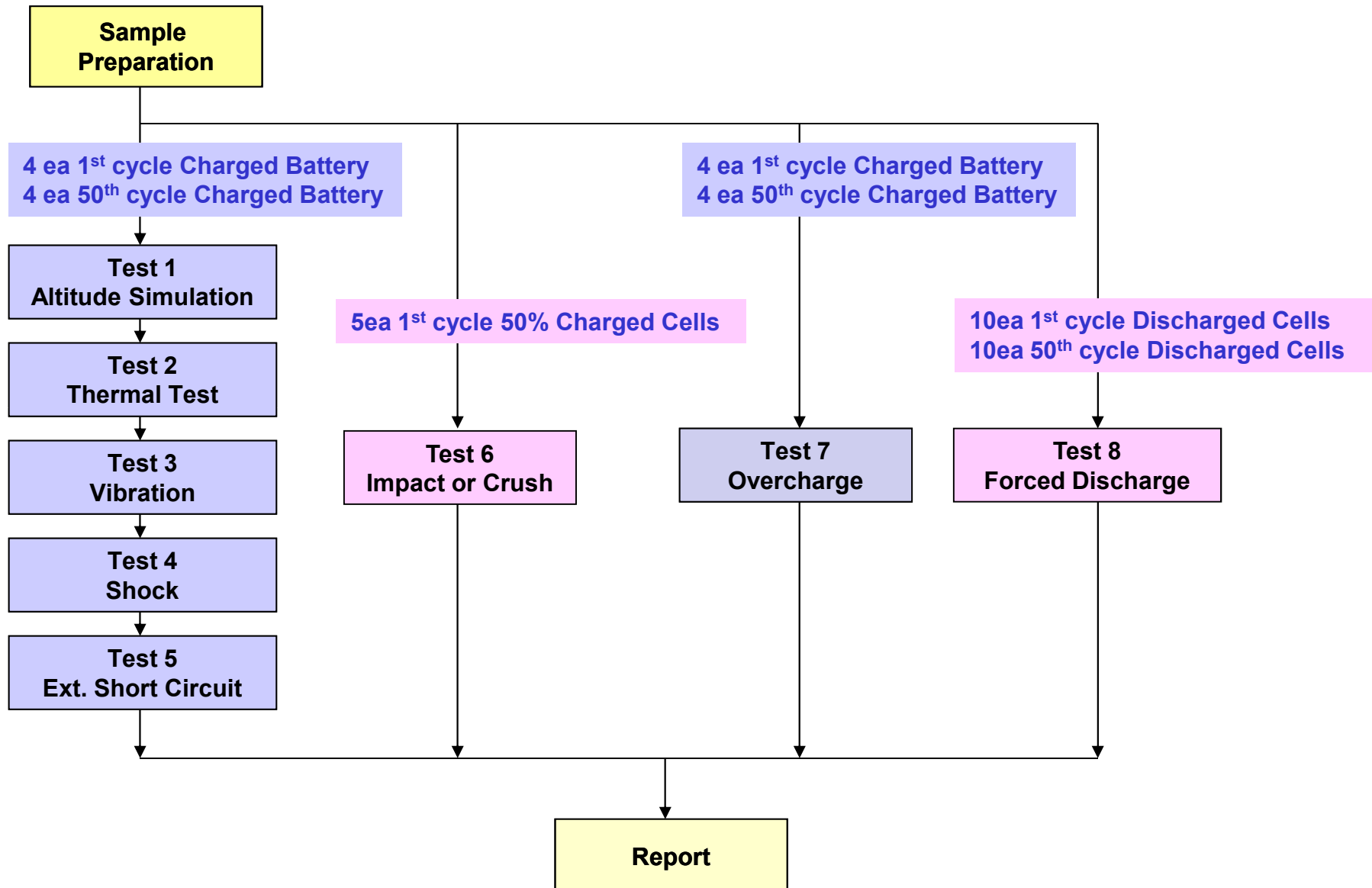
# 1. UN Transportation Regulation Test

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 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 state

Charge	1	8.350	162.397	8.349	162.382	99.99	0.009	Pass	8.252	162.373	98.84	0.006	Pass	8.244	162.356	99.90	0.011	Pass	8.239	162.341	99.93	0.009	Pass
	2	8.344	162.319	8.339	162.309	99.93	0.006	Pass	8.234	162.286	98.74	0.014	Pass	8.230	162.278	99.95	0.005	Pass	8.229	162.272	99.99	0.004	Pass
	3	8.342	162.521	8.336	162.518	99.93	0.002	Pass	8.226	162.516	98.67	0.001	Pass	8.218	162.500	99.90	0.009	Pass	8.216	162.492	99.98	0.005	Pass
	4	8.342	162.932	8.336	162.919	99.93	0.008	Pass	8.244	162.914	98.89	0.003	Pass	8.243	162.898	99.99	0.010	Pass	8.242	162.887	99.98	0.007	Pass
	Ave.	8.345	162.542	8.340	162.532	99.947	0.006		8.239	162.522	98.784	0.006		8.234	162.508	99.939	0.009		8.231	162.498	99.970	0.006	

## B. 50th cycle fully state

Charge	5	8.329	162.091	8.327	162.088	99.97	0.002	Pass	8.205	162.069	98.53	0.012	Pass	8.202	162.054	99.97	0.010	Pass	8.195	162.045	99.91	0.005	Pass
	6	8.344	162.473	8.339	162.472	99.93	0.000	Pass	8.245	162.471	98.88	0.001	Pass	8.242	162.469	99.95	0.001	Pass	8.239	162.462	99.97	0.004	Pass
	7	8.344	162.101	8.343	162.098	99.98	0.002	Pass	8.229	162.088	98.64	0.006	Pass	8.224	162.068	99.94	0.012	Pass	8.222	162.058	99.97	0.006	Pass
	8	8.332	162.563	8.328	162.562	99.96	0.001	Pass	8.218	162.546	98.67	0.010	Pass	8.211	162.532	99.92	0.008	Pass	8.205	162.519	99.92	0.008	Pass
	Ave.	8.337	162.307	8.334	162.305	99.962	0.001		8.224	162.293	98.681	0.007		8.220	162.281	99.947	0.008		8.215	162.271	99.943	0.006	

<b>Requirement</b>	<ul style="list-style-type: none"> <li>- Measuring mass before/after each test (If <math>M &gt; 75g</math>, less than 0.1%, <math>1g \leq M \leq 75</math>, less than 0.2%, <math>M &lt; 1g</math>, less than 0.5%)</li> <li>- Measuring voltage before/after each test (more than 90%, only charged samples)</li> <li>- No leakage, no venting, no disassembly, no rupture, no fire</li> </ul>
--------------------	---

# 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	8.239	55.41	Pass
	2	8.229	55.29	Pass
	3	8.216	55.82	Pass
	4	8.242	55.67	Pass
	MAX.	8.242	55.82	-

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	8.377	25.59	Pass
	10	8.338	25.67	Pass
	11	8.383	25.91	Pass
	12	8.385	25.07	Pass
	MAX.	8.385	25.91	-

Test Condition
- Max. Charge Current : 2784mA - CC/CV 2Imax(5568mA) 16.8V cut-off 24Hr

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

## B. 50th cycle fully state

Charge	5	8.195	54.80	Pass
	6	8.239	54.85	Pass
	7	8.222	54.61	Pass
	8	8.205	54.27	Pass
	MAX.	8.239	54.85	-

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	8.234	25.32	Pass
	14	8.295	25.37	Pass
	15	8.341	25.13	Pass
	16	8.345	25.28	Pass
	MAX.	8.345	25.37	-

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

# 3-3. T6/T8 Test Result (ICP306572L1)

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

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

Flat	C-1	3.799	23.65	Pass
	C-2	3.799	23.74	Pass
	C-3	3.798	22.98	Pass
	C-4	3.799	22.84	Pass
	C-5	3.798	23.12	Pass
<b>MAX.</b>		3.799	23.27	-

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	3.331	41.23	Pass
C-7	3.340	43.78	Pass
C-8	3.325	36.59	Pass
C-9	3.327	41.63	Pass
C-10	3.329	38.56	Pass
C-11	3.330	40.20	Pass
C-12	3.324	39.82	Pass
C-13	3.325	38.70	Pass
C-14	3.332	42.89	Pass
C-15	3.326	42.10	Pass
<b>MAX.</b>	3.329	40.55	-

## B. 50th cycle fully discharged state

C-16	3.531	42.14	Pass
C-17	3.542	39.47	Pass
C-18	3.533	37.53	Pass
C-19	3.541	42.58	Pass
C-20	3.521	42.33	Pass
C-21	3.545	40.22	Pass
C-22	3.538	37.40	Pass
C-23	3.540	42.69	Pass
C-24	3.528	43.75	Pass
C-25	3.533	42.39	Pass
<b>MAX.</b>	3.535	41.05	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 1740mA Duration time: rated capacity (60.0min )

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

# 4. Sample Image

