




문서번호	QAE-EF02-150303-PKASM PN SB10F46466	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	정규채	
Approved	김병수	

SolutionPartner

UN Test Report

- ASM P/N SB10F46466(Nom.53Wh, 15.2V)-

목 차

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

2015. 03. 03

 **LG Chem**

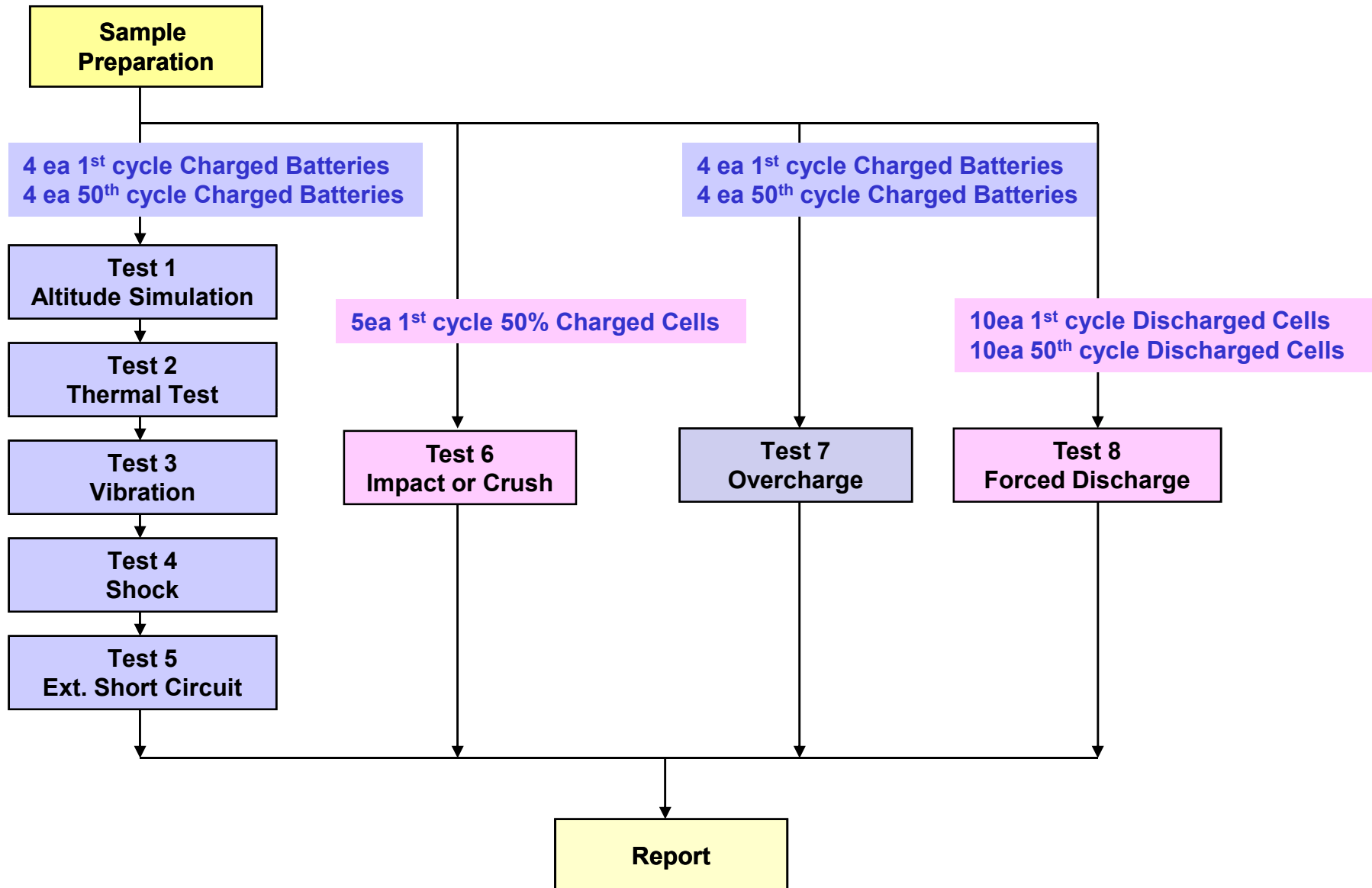
1. UN Transportation Regulation Test

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℃		- No disassembly, no rupture, no fire within 6 hours after the test - Temp. monitoring (max. 170℃)
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	17.374	243.13	17.364	243.12	99.94	0.004	Pass	17.148	243.10	98.76	0.008	Pass	17.145	243.10	99.98	0.000	Pass	17.143	243.08	99.99	0.008	Pass
	2	17.354	243.09	17.337	243.09	99.90	0.000	Pass	17.110	243.09	98.69	0.000	Pass	17.104	243.08	99.96	0.004	Pass	17.101	243.08	99.98	0.000	Pass
	3	17.343	243.02	17.328	243.01	99.91	0.004	Pass	17.102	242.99	98.70	0.008	Pass	17.099	242.97	99.98	0.008	Pass	17.094	242.96	99.97	0.004	Pass
	4	17.352	243.10	17.319	243.09	99.81	0.004	Pass	17.116	243.08	98.83	0.004	Pass	17.113	243.06	99.98	0.008	Pass	17.111	243.05	99.99	0.004	Pass
	Ave.	17.356	243.09	17.337	243.08	99.89	0.003	-	17.119	243.07	98.74	0.005	-	17.115	243.05	99.98	0.005	-	17.112	243.04	99.98	0.004	-

B. 50th cycle fully charged state

Charge	5	17.350	243.00	17.338	242.99	99.93	0.004	Pass	17.139	242.98	98.85	0.004	Pass	17.135	242.97	99.98	0.004	Pass	17.128	242.97	99.96	0.000	Pass
	6	17.368	242.95	17.336	242.93	99.82	0.008	Pass	17.127	242.93	98.79	0.000	Pass	17.121	242.91	99.96	0.008	Pass	17.118	242.90	99.98	0.004	Pass
	7	17.363	242.94	17.340	242.92	99.87	0.008	Pass	17.109	242.92	98.67	0.000	Pass	17.106	242.91	99.98	0.004	Pass	17.104	242.90	99.99	0.004	Pass
	8	17.368	242.96	17.327	242.92	99.76	0.016	Pass	17.126	242.90	98.84	0.008	Pass	17.123	242.89	99.98	0.004	Pass	17.118	242.88	99.97	0.004	Pass
	Ave.	17.362	242.96	17.335	242.94	99.84	0.009	-	17.125	242.93	98.79	0.003	-	17.121	242.92	99.98	0.005	-	17.117	242.91	99.98	0.003	-

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
--------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

3-2. T5/T7 Test Result

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

A. 1st cycle fully charged state

Charge	1	17.143	55.47	Pass
	2	17.101	55.66	Pass
	3	17.094	56.12	Pass
	4	17.111	54.39	Pass
	MAX.	17.143	56.12	-

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 charged state

Charge	9	17.345	26.04	Pass
	10	17.349	25.88	Pass
	11	17.343	25.73	Pass
	12	17.340	25.23	Pass
	MAX.	17.349	26.04	-

Test Condition
- Max. Charge Current : 3390mA - CC/CV 2Imax(6780mA) 22V cut-off 24Hr

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

B. 50th cycle fully charged state

Charge	5	17.128	55.81	Pass
	6	17.118	55.89	Pass
	7	17.104	55.47	Pass
	8	17.118	54.82	Pass
	MAX.	17.128	55.89	-

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 charged state

Charge	13	17.325	25.17	Pass
	14	17.328	25.33	Pass
	15	17.326	25.81	Pass
	16	17.326	25.53	Pass
	MAX.	17.328	25.81	-

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

3-3. T6/T8 Test Result (ICP3948125L1)

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

A. 1st cycle 50% charged state

Flat	C-1	3.852	23.07	Pass
	C-2	3.851	23.05	Pass
	C-3	3.848	23.04	Pass
	C-4	3.850	23.11	Pass
	C-5	3.851	23.10	Pass
MAX.		3.852	23.11	-

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	3.010	46.33	Pass
C-7	3.011	45.42	Pass
C-8	3.008	44.22	Pass
C-9	3.013	47.14	Pass
C-10	3.009	48.23	Pass
C-11	3.013	47.49	Pass
C-12	3.010	47.50	Pass
C-13	3.015	47.26	Pass
C-14	3.011	46.48	Pass
C-15	3.012	47.31	Pass
MAX.	3.015	48.23	-

B. 50th cycle fully discharged state

C-16	3.123	44.72	Pass
C-17	3.121	44.27	Pass
C-18	3.117	43.22	Pass
C-19	3.119	44.53	Pass
C-20	3.118	44.66	Pass
C-21	3.122	45.55	Pass
C-22	3.120	46.83	Pass
C-23	3.118	44.68	Pass
C-24	3.124	44.71	Pass
C-25	3.113	43.10	Pass
MAX.	3.123	46.83	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 3390mA Duration time: rated capacity (61min)

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

4. Sample Image

