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UN Test Report
- ASM P/N SB10F46442(Nom.36Wh, 7.4V)-

목 차

2014. 03. 25

LG Chem

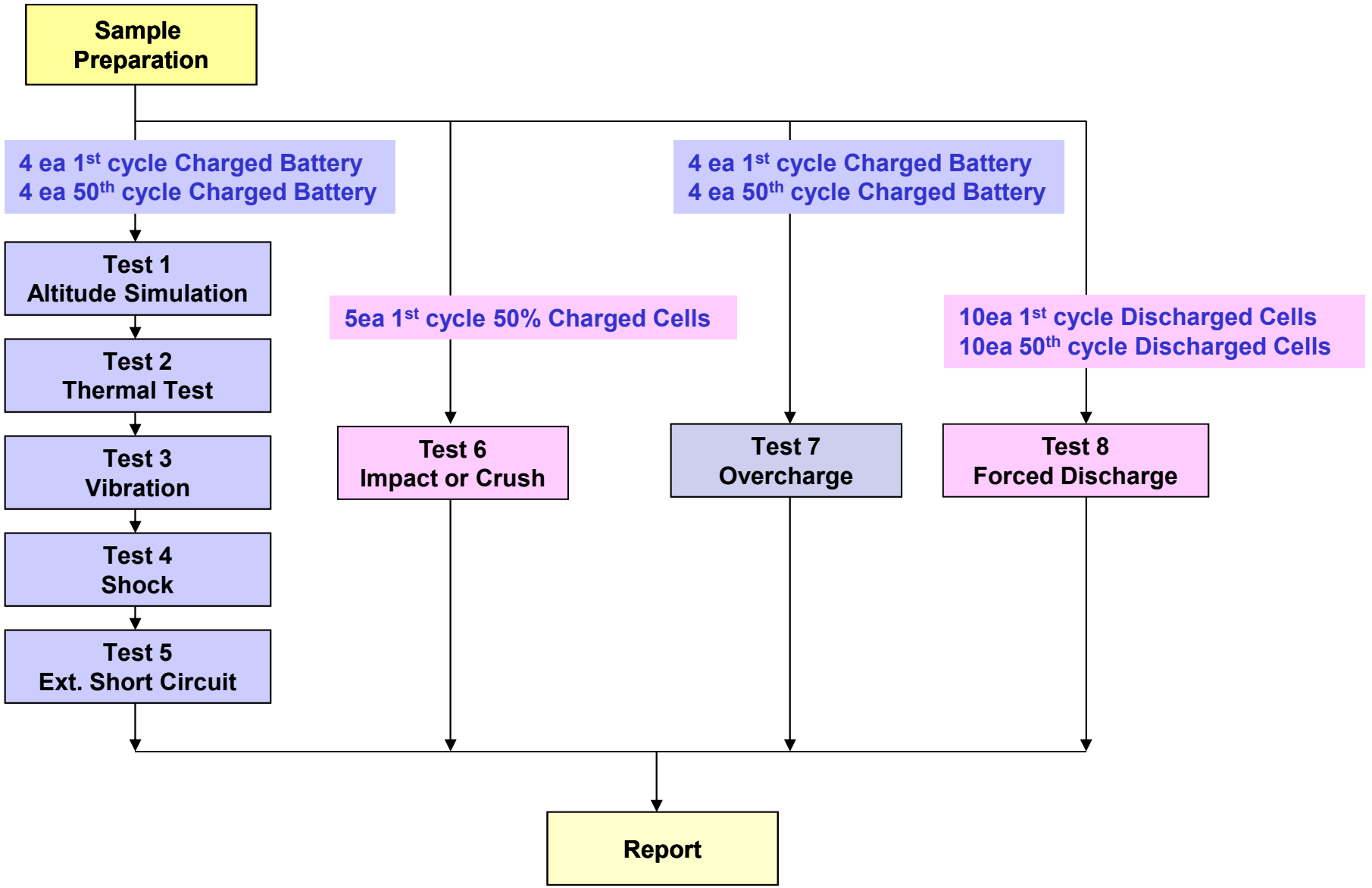
1. UN Transportation Regulation Test

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≤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℃	- 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 state																							
Charge	1	8.344	180.285	8.341	180.284	99.97	0.001	Pass	8.257	180.276	98.99	0.005	Pass	8.255	180.253	99.99	0.013	Pass	8.255	180.233	100.00	0.011	Pass
	2	8.345	180.513	8.344	180.505	99.99	0.004	Pass	8.255	180.500	98.94	0.003	Pass	8.248	180.487	99.91	0.007	Pass	8.242	180.468	99.94	0.011	Pass
	3	8.346	180.122	8.342	180.120	99.95	0.001	Pass	8.255	180.113	98.95	0.004	Pass	8.252	180.088	99.97	0.014	Pass	8.246	180.086	99.92	0.001	Pass
	4	8.348	180.303	8.343	180.291	99.94	0.006	Pass	8.253	180.278	98.92	0.007	Pass	8.252	180.271	99.99	0.004	Pass	8.249	180.257	99.97	0.008	Pass
	Ave.	8.345	180.306	8.342	180.300	99.96	0.003	-	8.255	180.292	98.95	0.005	-	8.252	180.275	99.96	0.009	-	8.248	180.261	99.96	0.008	-
B. 50th cycle fully state																							
Charge	5	8.327	180.197	8.325	180.179	99.97	0.010	Pass	8.239	180.176	98.97	0.002	Pass	8.239	180.152	100.00	0.013	Pass	8.233	180.140	99.92	0.006	Pass
	6	8.326	180.217	8.322	180.211	99.96	0.003	Pass	8.233	180.205	98.93	0.004	Pass	8.228	180.201	99.94	0.002	Pass	8.222	180.192	99.93	0.005	Pass
	7	8.330	180.594	8.327	180.585	99.97	0.005	Pass	8.238	180.561	98.93	0.013	Pass	8.237	180.545	99.99	0.009	Pass	8.233	180.542	99.95	0.002	Pass
	8	8.338	180.425	8.335	180.403	99.97	0.012	Pass	8.243	180.396	98.90	0.004	Pass	8.241	180.382	99.97	0.008	Pass	8.236	180.369	99.93	0.007	Pass
	Ave.	8.330	180.358	8.327	180.345	99.97	0.008	-	8.238	180.334	98.93	0.006	-	8.236	180.320	99.97	0.008	-	8.231	180.311	99.93	0.005	-

Requirement	- Measuring mass before/after each test (If M>75g, less than 0.1%, 1g≤M≤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 (℃)	Result
A. 1st cycle fully state				
Charge	1	8.255	60.18	Pass
	2	8.242	55.04	Pass
	3	8.246	55.23	Pass
	4	8.249	55.69	Pass
	MAX.	8.255	60.18	-

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully state				
Charge	5	8.233	54.39	Pass
	6	8.222	54.44	Pass
	7	8.233	54.83	Pass
	8	8.236	54.60	Pass
	MAX.	8.236	54.83	-

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

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

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully state				
Charge	9	8.367	25.21	Pass
	10	8.307	25.64	Pass
	11	8.342	25.39	Pass
	12	8.310	25.21	Pass
	MAX.	8.367	25.64	-

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully state				
Charge	13	8.297	25.00	Pass
	14	8.282	25.49	Pass
	15	8.353	25.27	Pass
	16	8.363	25.68	Pass
	MAX.	8.363	25.68	-

Test Condition
- Max. Charge Current : 3744mA - CC/CV 2Imax(7488mA) 16.8V cut-off 24Hr

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

3-3. T6/T8 Test Result (ICP3975116L1)

Crush (T6)				
Direction	NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state (Direction :Flat)				
Flat	C-1	3.798	24.15	Pass
	C-2	3.798	23.35	Pass
	C-3	3.798	23.29	Pass
	C-4	3.798	24.12	Pass
	C-5	3.797	23.41	Pass
MAX.		3.798	24.15	-

Test Condition
- Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation

Requirement
- Temperature ≤ 170 (℃)
- No disassembly, no fire within 6 hours after the test

Forced Discharge (T8)			
NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle fully Discharged state			
C-6	3.333	38.12	Pass
C-7	3.321	43.25	Pass
C-8	3.339	38.25	Pass
C-9	3.324	39.64	Pass
C-10	3.324	42.29	Pass
C-11	3.332	41.39	Pass
C-12	3.319	37.44	Pass
C-13	3.329	40.94	Pass
C-14	3.324	43.08	Pass
C-15	3.334	39.52	Pass
MAX.	3.339	43.25	-
B. 50th cycle fully discharged state			
C-16	3.556	38.74	Pass
C-17	3.561	42.15	Pass
C-18	3.542	43.52	Pass
C-19	3.539	39.15	Pass
C-20	3.544	40.98	Pass
C-21	3.553	39.57	Pass
C-22	3.562	42.73	Pass
C-23	3.553	40.52	Pass
C-24	3.571	41.76	Pass
C-25	3.564	39.56	Pass
MAX.	3.571	43.52	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 4680mA Duration time: rated capacity (60.0min)

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

4. Sample Image