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UN Test Report
- SB10J78993(Nom.37Wh, 7.64V)-

목 차

2015. 08. 17

LG Chem

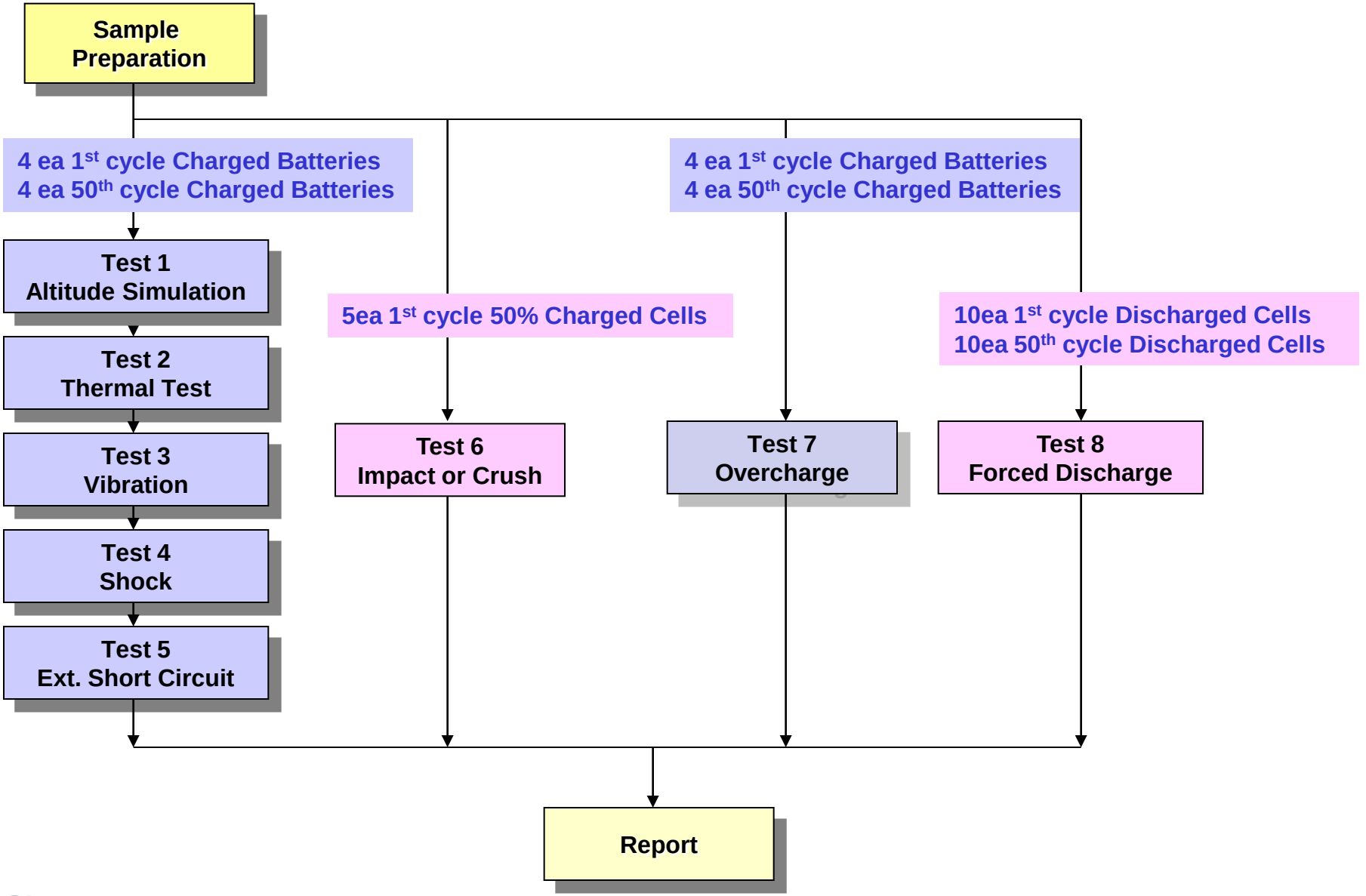
1. UN Transportation Regulation Test

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 charged state																							
Charge	**1**	8.672	158.31	8.671	158.30	99.99	0.006	**Pass**	8.569	158.30	98.82	0.000	**Pass**	8.565	158.29	99.95	0.006	**Pass**	8.565	158.29	100.00	0.000	**Pass**
	2	8.658	158.54	8.653	158.53	99.94	0.006	**Pass**	8.537	158.53	98.66	0.000	**Pass**	8.536	158.51	99.99	0.013	**Pass**	8.536	158.51	100.00	0.000	**Pass**
	3	8.657	157.87	8.655	157.86	99.98	0.006	**Pass**	8.554	157.85	98.83	0.006	**Pass**	8.554	157.83	100.00	0.013	**Pass**	8.553	157.82	99.99	0.006	**Pass**
	4	8.659	157.85	8.654	157.84	99.94	0.006	**Pass**	8.538	157.84	98.66	0.000	**Pass**	8.537	157.82	99.99	0.013	**Pass**	8.535	157.82	99.98	0.000	**Pass**
	Ave.	8.662	158.14	8.658	158.13	99.96	0.006	-	8.550	158.13	98.74	0.002	-	8.548	158.11	99.98	0.011	-	8.547	158.11	99.99	0.002	-
B. 50th cycle fully charged state																							
Charge	**5**	8.653	158.14	8.652	158.14	99.99	0.000	**Pass**	8.543	158.13	98.74	0.006	**Pass**	8.543	158.12	100.00	0.006	**Pass**	8.543	158.11	100.00	0.006	**Pass**
	6	8.669	157.97	8.666	157.96	99.97	0.006	**Pass**	8.549	157.95	98.65	0.006	**Pass**	8.548	157.94	99.99	0.006	**Pass**	8.545	157.94	99.96	0.000	**Pass**
	7	8.651	158.09	8.650	158.08	99.99	0.006	**Pass**	8.544	158.08	98.77	0.000	**Pass**	8.543	158.07	99.99	0.006	**Pass**	8.540	158.07	99.96	0.000	**Pass**
	8	8.667	157.90	8.662	157.89	99.94	0.006	**Pass**	8.547	157.87	98.67	0.013	**Pass**	8.544	157.85	99.96	0.013	**Pass**	8.541	157.84	99.96	0.006	**Pass**
	Ave.	8.660	158.03	8.658	158.02	99.97	0.005	-	8.546	158.01	98.71	0.006	-	8.545	158.00	99.99	0.008	-	8.542	157.99	99.97	0.003	-

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 charged state				
Charge	1	8.565	56.32	Pass
	2	8.536	55.09	Pass
	3	8.553	55.57	Pass
	4	8.535	55.32	Pass
	MAX.	8.565	56.32	-

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state				
Charge	5	8.543	56.29	Pass
	6	8.545	54.74	Pass
	7	8.540	55.45	Pass
	8	8.541	56.27	Pass
	MAX.	8.545	56.29	-

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 charged state				
Charge	9	8.646	24.30	Pass
	10	8.640	24.11	Pass
	11	8.649	24.06	Pass
	12	8.649	15.12	Pass
	MAX.	8.649	24.30	-

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state				
Charge	13	8.624	24.42	Pass
	14	8.620	24.85	Pass
	15	8.621	23.48	Pass
	16	8.622	23.80	Pass
	MAX.	8.624	24.85	-

Test Condition
- Max. Charge Current : 4780mA - CC/CV 2Imax(9560mA) 17.4V cut-off 24Hr

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

3-3. T6/T8 Test Result (ICP3583103A1)

Crush (T6)

Direction	NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state				
Flat	C-1	3.851	23.09	Pass
	C-2	3.852	23.04	Pass
	C-3	3.849	23.05	Pass
	C-4	3.851	23.13	Pass
	C-5	3.852	23.09	Pass
MAX.		3.852	23.13	-

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	3.012	46.32	Pass
C-7	3.010	45.74	Pass
C-8	3.009	44.21	Pass
C-9	3.015	47.13	Pass
C-10	3.009	48.21	Pass
C-11	3.014	47.56	Pass
C-12	3.008	47.46	Pass
C-13	3.014	47.20	Pass
C-14	3.010	46.49	Pass
C-15	3.014	47.32	Pass
MAX.	3.015	48.21	-
B. 50th cycle fully discharged state			
C-16	3.121	44.84	Pass
C-17	3.122	44.26	Pass
C-18	3.118	43.21	Pass
C-19	3.120	44.56	Pass
C-20	3.117	45.26	Pass
C-21	3.123	45.52	Pass
C-22	3.119	46.79	Pass
C-23	3.120	44.52	Pass
C-24	3.122	44.62	Pass
C-25	3.116	42.69	Pass
MAX.	3.123	46.79	-

Test Condition

- Discharge at max. discharge current (with 12V DC power supply) : 7500mA
  Duration time: rated capacity (39min)

Requirement

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

4. Sample Image