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UN Test Report
- SB10J79000 (Nom.40Wh, 7.6V)-

목 차

2015. 08. 24

LG Chem

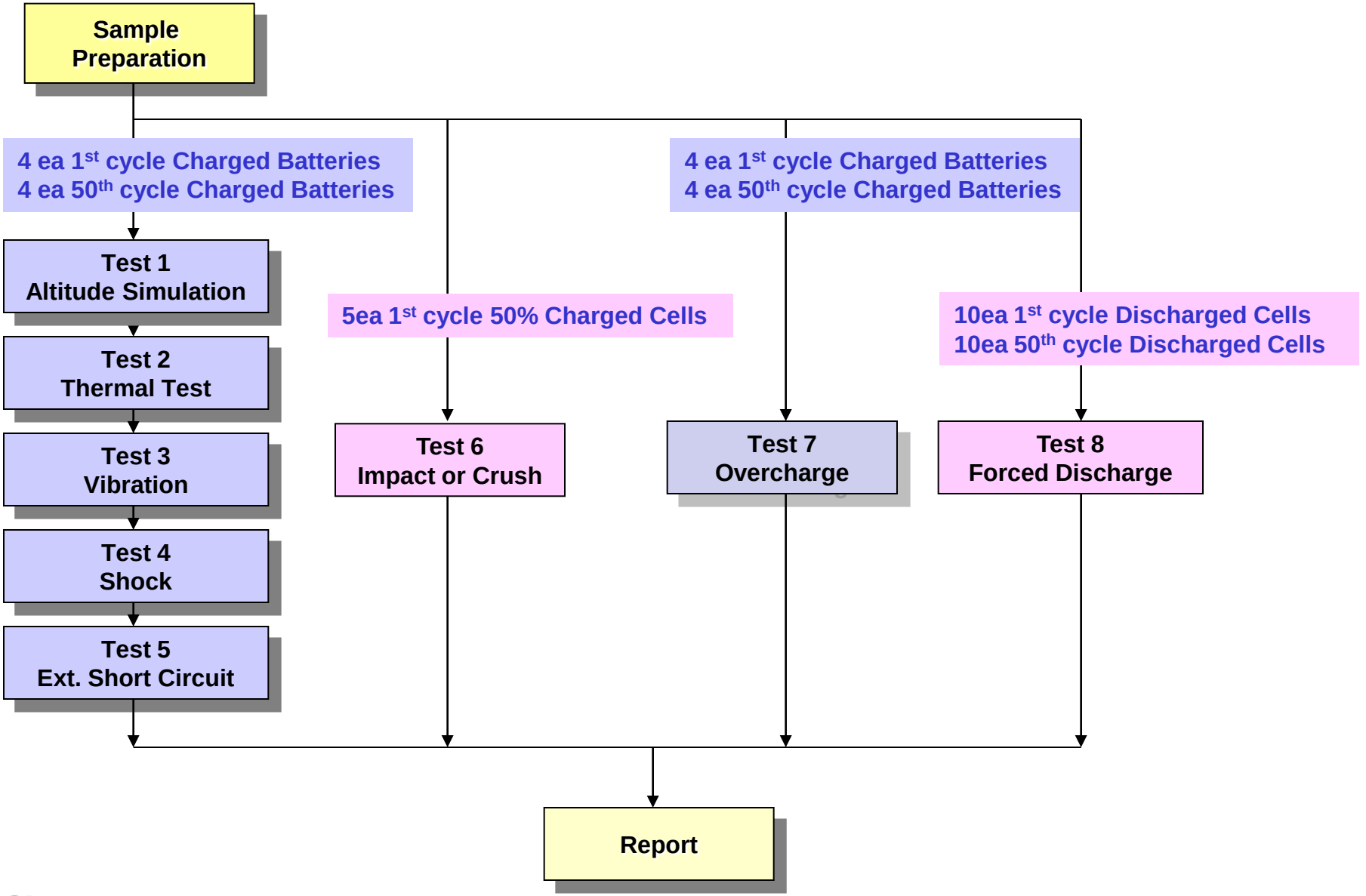
1. UN Transportation Regulation Test

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**	8.570	177.39	8.567	177.39	99.96	0.000	**Pass**	8.456	177.38	98.70	0.006	**Pass**	8.456	177.37	100.00	0.006	**Pass**	8.454	177.37	99.98	0.000	**Pass**
	2	8.573	177.43	8.573	177.43	100.00	0.000	**Pass**	8.474	177.42	98.85	0.006	**Pass**	8.473	177.41	99.99	0.006	**Pass**	8.470	177.41	99.96	0.000	**Pass**
	3	8.567	177.43	8.565	177.43	99.98	0.000	**Pass**	8.459	177.43	98.76	0.000	**Pass**	8.455	177.42	99.95	0.006	**Pass**	8.452	177.41	99.96	0.006	**Pass**
	4	8.574	177.56	8.571	177.56	99.97	0.000	**Pass**	8.461	177.55	98.72	0.006	**Pass**	8.461	177.54	100.00	0.006	**Pass**	8.457	177.54	99.95	0.000	**Pass**
	Ave.	8.571	177.45	8.569	177.45	99.98	0.000	**-**	8.463	177.45	98.76	0.004	**-**	8.461	177.44	99.99	0.006	**-**	8.458	177.43	99.96	0.001	**-**
B. 50th cycle fully charged state																							
Charge	**5**	8.560	177.35	8.557	177.35	99.96	0.000	**Pass**	8.441	177.33	98.64	0.011	**Pass**	8.438	177.32	99.96	0.006	**Pass**	8.438	177.31	100.00	0.006	**Pass**
	6	8.564	177.40	8.561	177.39	99.96	0.006	**Pass**	8.459	177.38	98.81	0.006	**Pass**	8.456	177.36	99.96	0.011	**Pass**	8.455	177.35	99.99	0.006	**Pass**
	7	8.563	177.48	8.560	177.48	99.96	0.000	**Pass**	8.451	177.46	98.73	0.011	**Pass**	8.451	177.43	100.00	0.017	**Pass**	8.448	177.43	99.96	0.000	**Pass**
	8	8.560	177.35	8.558	177.34	99.98	0.006	**Pass**	8.453	177.33	98.77	0.006	**Pass**	8.451	177.32	99.98	0.006	**Pass**	8.448	177.31	99.96	0.006	**Pass**
	Ave.	8.562	177.40	8.559	177.39	99.97	0.003	**-**	8.451	177.38	98.74	0.008	**-**	8.449	177.36	99.98	0.010	**-**	8.447	177.35	99.98	0.004	**-**

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	8.454	55.91	Pass
	2	8.470	56.02	Pass
	3	8.452	56.61	Pass
	4	8.457	54.93	Pass
	MAX.	8.470	56.61	-

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state				
Charge	5	8.438	54.94	Pass
	6	8.455	56.54	Pass
	7	8.448	56.01	Pass
	8	8.448	56.07	Pass
	MAX.	8.455	56.54	-

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	8.544	25.09	Pass
	10	8.541	24.27	Pass
	11	8.540	23.30	Pass
	12	8.542	24.23	Pass
	MAX.	8.544	25.09	-

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully charged state				
Charge	13	8.527	24.05	Pass
	14	8.523	25.25	Pass
	15	8.521	24.95	Pass
	16	8.523	24.86	Pass
	MAX.	8.527	25.25	-

Test Condition
- Max. Charge Current : 2590mA - CC/CV 2Imax(5180mA) 17.4V cut-off 24Hr

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

3-3. T6/T8 Test Result (ICP505070A1)

Crush (T6)

Direction	NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state				
Flat	C-1	3.743	23.25	Pass
	C-2	3.754	22.71	Pass
	C-3	3.751	23.12	Pass
	C-4	3.756	23.42	Pass
	C-5	3.751	23.15	Pass
MAX.		3.756	23.42	-

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	3.011	47.52	Pass
C-7	3.021	49.11	Pass
C-8	3.028	46.87	Pass
C-9	3.024	49.22	Pass
C-10	3.022	48.12	Pass
C-11	3.014	49.10	Pass
C-12	3.011	49.23	Pass
C-13	3.012	48.42	Pass
C-14	3.011	49.95	Pass
C-15	3.017	47.76	Pass
MAX.	3.028	49.95	-
B. 50th cycle fully discharged state			
C-16	3.142	45.13	Pass
C-17	3.146	46.58	Pass
C-18	3.147	46.21	Pass
C-19	3.139	46.39	Pass
C-20	3.136	45.59	Pass
C-21	3.139	45.62	Pass
C-22	3.135	46.28	Pass
C-23	3.141	45.46	Pass
C-24	3.136	45.72	Pass
C-25	3.136	45.55	Pass
MAX.	3.147	46.58	-

Test Condition

- Discharge at max. discharge current (with 12V DC power supply) : 3750mA
  Duration time: rated capacity (42min)

Requirement

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

4. Sample Image