문서번호	QAE-EF02-140703-PKASM PN45N1726, ASM PN45N1730	
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UN Test Report

- ASM P/N 45N1726, ASM P/N 45N1730 (Nom.33Wh, 3.7V)-

목 차

2014. 07. 03

LG Chem

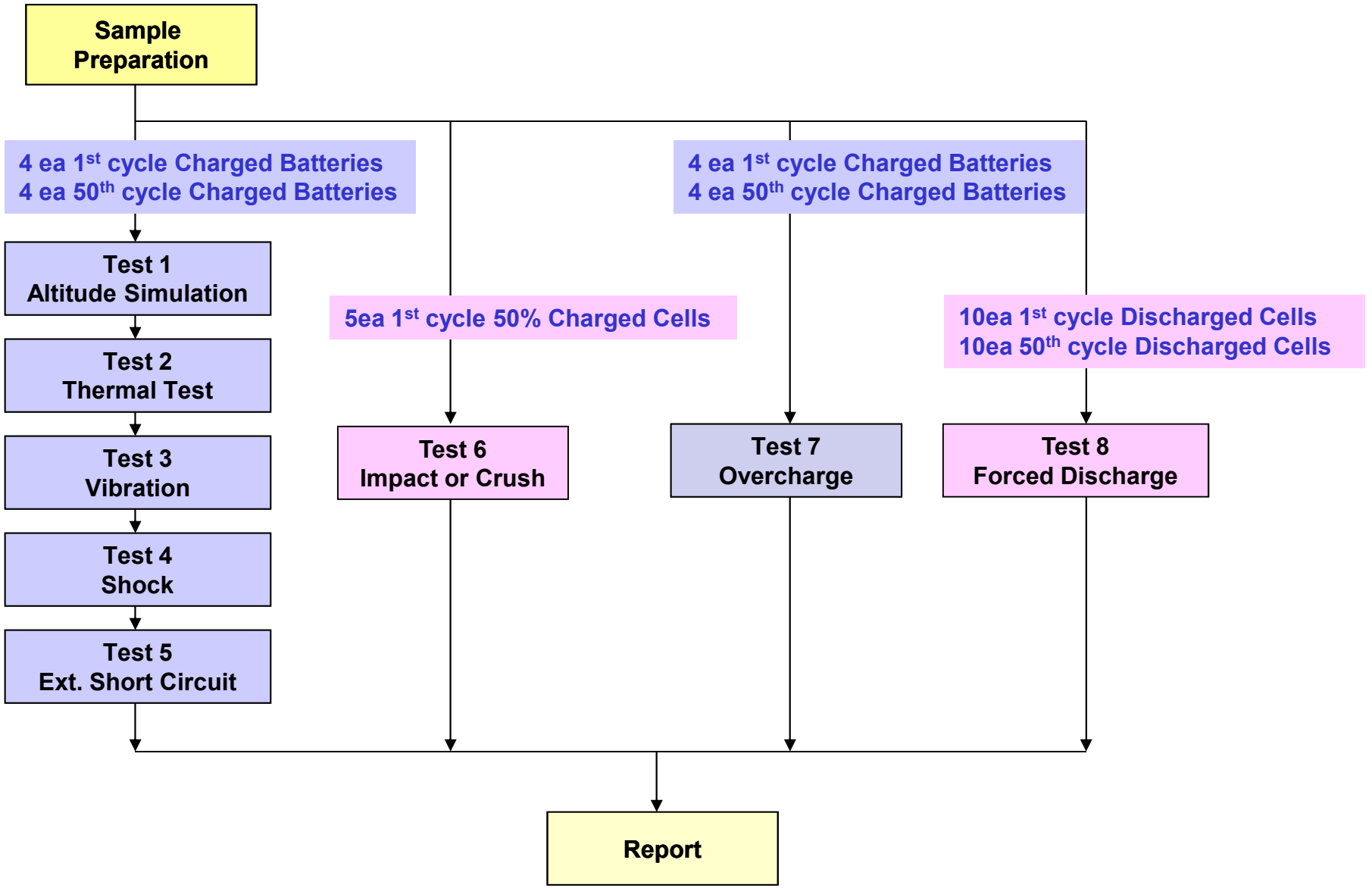
1. UN Transportation Regulation Test

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≤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	4.142	169.01	4.142	168.99	100.00	0.012	Pass	4.088	168.99	98.69	0.001	Pass	4.086	168.98	99.96	0.002	Pass	4.085	168.98	99.98	0.003	Pass
	2	4.144	169.06	4.143	169.04	99.97	0.006	Pass	4.095	169.03	98.85	0.007	Pass	4.094	169.02	99.99	0.005	Pass	4.094	169.02	99.99	0.001	Pass
	3	4.145	168.96	4.145	168.95	99.99	0.009	Pass	4.094	168.93	98.77	0.008	Pass	4.093	168.93	99.98	0.000	Pass	4.092	168.93	99.97	0.003	Pass
	4	4.142	168.99	4.142	168.98	99.99	0.006	Pass	4.087	168.97	98.68	0.007	Pass	4.086	168.95	99.97	0.008	Pass	4.085	168.95	99.98	0.003	Pass
	Ave.	4.143	169.003	4.143	168.989	99.99	0.008	-	4.091	168.979	98.74	0.006	-	4.090	168.973	99.98	0.004	-	4.089	168.969	99.98	0.003	-
B. 50th cycle fully state																							
Charge	5	4.138	169.21	4.138	169.19	99.99	0.011	Pass	4.088	169.18	98.81	0.004	Pass	4.088	169.18	100.00	0.003	Pass	4.088	169.17	99.98	0.004	Pass
	6	4.142	169.11	4.141	169.11	99.98	0.002	Pass	4.092	169.10	98.82	0.003	Pass	4.092	169.10	99.99	0.001	Pass	4.091	169.10	99.99	0.002	Pass
	7	4.140	169.01	4.138	168.99	99.96	0.010	Pass	4.083	168.99	98.66	0.001	Pass	4.083	168.97	99.99	0.007	Pass	4.082	168.97	99.99	0.000	Pass
	8	4.143	169.13	4.142	169.11	99.97	0.011	Pass	4.087	169.11	98.67	0.000	Pass	4.086	169.10	99.98	0.005	Pass	4.084	169.10	99.96	0.001	Pass
	Ave.	4.141	169.113	4.140	169.098	99.98	0.009	-	4.088	169.095	98.74	0.002	-	4.087	169.088	99.99	0.004	-	4.086	169.085	99.98	0.002	-

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	4.085	87.86	Pass
	2	4.094	72.32	Pass
	3	4.092	78.24	Pass
	4	4.085	81.55	Pass
	MAX.	4.094	87.86	-

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully state				
Charge	5	4.088	71.44	Pass
	6	4.091	67.92	Pass
	7	4.082	63.43	Pass
	8	4.084	86.24	Pass
	MAX.	4.091	86.24	-

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	4.147	24.88	Pass
	10	4.144	25.07	Pass
	11	4.144	25.21	Pass
	12	4.141	25.09	Pass
	MAX.	4.147	25.21	-

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully state				
Charge	13	4.140	25.17	Pass
	14	4.138	24.83	Pass
	15	4.142	25.30	Pass
	16	4.143	25.00	Pass
	MAX.	4.143	25.30	-

Test Condition
- Max. Charge Current : 4800mA - CC/CV 2Imax(9600mA) 8.4V cut-off 24Hr

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

3-3. T6/T8 Test Result (ICP3582114L1)

Crush (T6)				
Direction	NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state (Direction :Flat)				
Flat	C-1	3.796	23.24	Pass
	C-2	3.796	23.23	Pass
	C-3	3.796	23.26	Pass
	C-4	3.796	23.59	Pass
	C-5	3.796	23.75	Pass
MAX.		3.796	23.75	-

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	3.271	71.84	Pass
C-7	3.267	74.90	Pass
C-8	3.266	88.07	Pass
C-9	3.268	79.97	Pass
C-10	3.271	71.77	Pass
C-11	3.271	73.02	Pass
C-12	3.269	81.49	Pass
C-13	3.282	74.21	Pass
C-14	3.270	74.95	Pass
C-15	3.284	74.36	Pass
MAX.	3.284	88.07	-
B. 50th cycle fully discharged state			
C-16	3.545	78.99	Pass
C-17	3.575	103.57	Pass
C-18	3.584	94.15	Pass
C-19	3.579	80.12	Pass
C-20	3.667	72.75	Pass
C-21	3.581	81.61	Pass
C-22	3.563	81.08	Pass
C-23	3.557	81.15	Pass
C-24	3.564	79.89	Pass
C-25	3.571	71.12	Pass
MAX.	3.667	103.57	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 4410mA Duration time: rated capacity (60.0min)

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

4. Sample Image