




문서번호	QAE-EF02-120907-PKASMPN45N1112,LCPN121500145	
Prepared	김홍일	
	남익현	
	장승현	
Reviewed	남대호	
	이재승	
Approved	정준용	

SolutionPartner

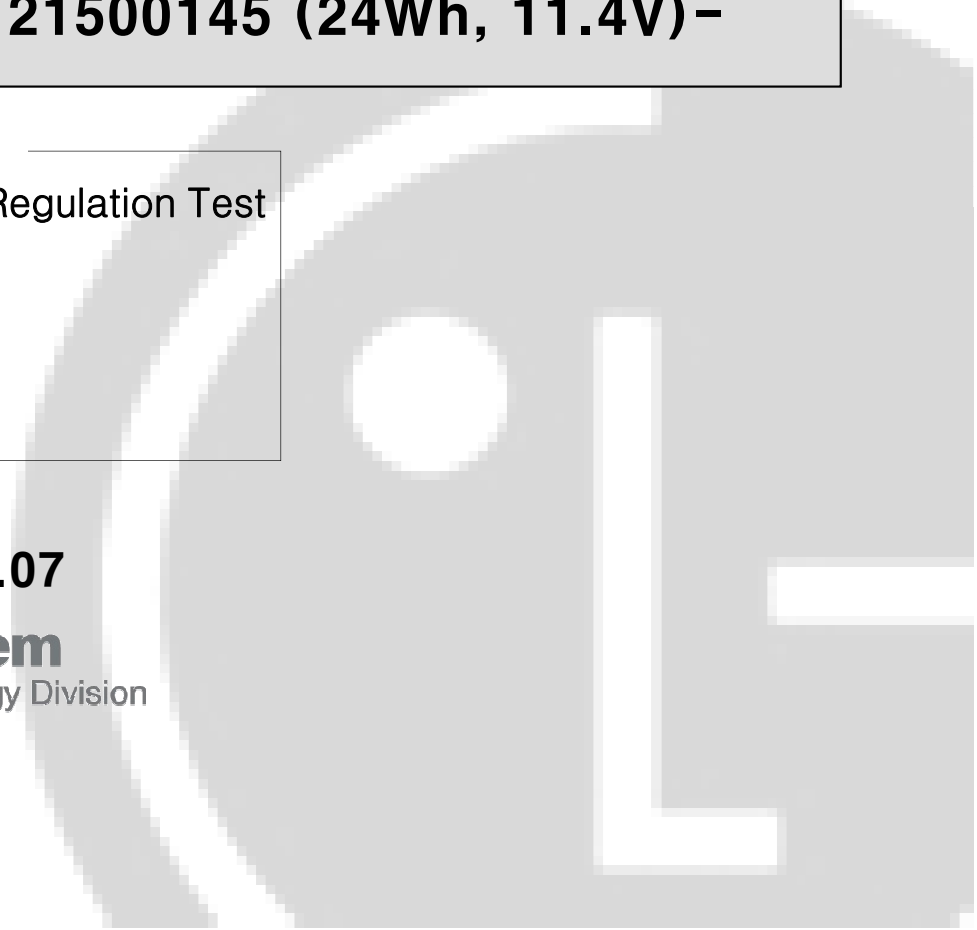
UN Test Report

- ASM P/N 45N1112, LC P/N 121500145 (24Wh, 11.4V)-

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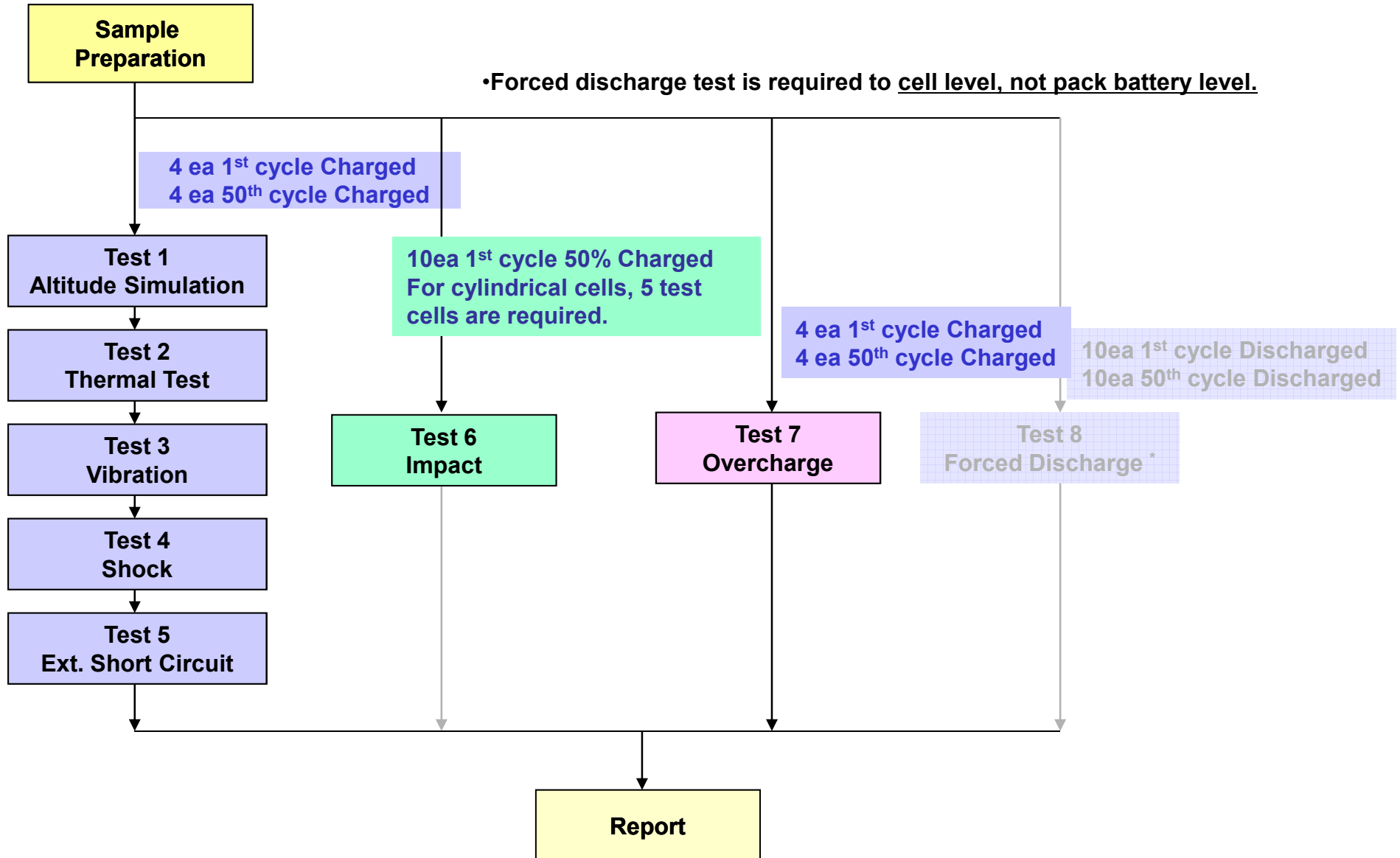
1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure) 11.6kPa for 6hr at 20+/-5°C	<ul style="list-style-type: none"> - Measuring mass before/ after each test (If M>5g, 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	[75±2°C, 6hr ↔ -40±2°C, 6hr, interval max. 30min] x 10 cycle Storing at 20±5°C 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°C 1hr continue after returning at 55±2°C	<ul style="list-style-type: none"> - No disassembly, no rupture, no fire (after 6 hours) - Temp. monitoring (max. 170°C)
Test 6. Impact	Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height	
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)	<ul style="list-style-type: none"> - No disassembly, no fire (after 7 days)
Test 8. Forced Discharge	Only for Cell, not battery.	<ul style="list-style-type: none"> - No disassembly, no fire (after 7 days)

* Tests through T1-T5 shall be conducted in sequence with the same battery.

* 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)

2. Test Procedure



3-1. T1-T4 Test Result

Before			Altitude (T1)					Thermal (T2)					Vibration (T3)					Shock (T4)				
Pack 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	12.833	133.125	12.831	133.125	99.98	0.000	Pass	12.711	133.118	99.06	0.005	Pass	12.710	133.117	99.99	0.001	Pass	12.709	133.116	99.99	0.001	Pass
	2	12.834	133.231	12.832	133.230	99.98	0.001	Pass	12.713	133.224	99.07	0.005	Pass	12.711	133.222	99.98	0.002	Pass	12.709	133.222	99.98	0.000	Pass
	3	12.839	133.211	12.837	133.210	99.98	0.001	Pass	12.705	133.203	98.97	0.005	Pass	12.703	133.201	99.98	0.002	Pass	12.702	133.200	99.99	0.001	Pass
	4	12.831	133.201	12.830	133.201	99.99	0.000	Pass	12.710	133.192	99.06	0.007	Pass	12.708	133.191	99.98	0.001	Pass	12.706	133.190	99.98	0.001	Pass
	Ave.	12.834	133.192	12.833	133.192	99.99	0.000	-	12.710	133.184	99.04	0.005	-	12.708	133.183	99.99	0.001	-	12.707	133.182	99.99	0.001	-

B. 50th cycle fully state

Charge	9	12.798	133.221	12.797	133.220	99.99	0.001	Pass	12.666	133.212	98.98	0.006	Pass	12.663	133.210	99.98	0.002	Pass	12.662	133.209	99.99	0.001	Pass
	10	12.795	133.219	12.795	133.218	100.00	0.001	Pass	12.675	133.209	99.06	0.007	Pass	12.673	133.208	99.98	0.001	Pass	12.670	133.207	99.98	0.001	Pass
	11	12.793	133.217	12.792	133.215	99.99	0.002	Pass	12.655	133.207	98.93	0.006	Pass	12.652	133.206	99.98	0.001	Pass	12.650	133.204	99.98	0.002	Pass
	12	12.796	133.220	12.795	133.218	99.99	0.002	Pass	12.669	133.209	99.02	0.007	Pass	12.667	133.207	99.98	0.002	Pass	12.665	133.205	99.98	0.002	Pass
	Ave.	12.796	133.219	12.795	133.218	99.99	0.001	-	12.666	133.209	99.00	0.006	-	12.664	133.208	99.98	0.001	-	12.662	133.206	99.98	0.001	-

Requirement	<ul style="list-style-type: none"> - Measuring mass before/after each test (If M>5g, less than 0.1%) - Measuring voltage before/after each test (more than 90%, only charged samples) - No leakage, no venting, no disassembly, no rupture, no fire
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3-2. T5/T7 Test Result

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

A. 1st cycle fully state

Charge	1	12.709	55.83	Pass
	2	12.709	55.40	Pass
	3	12.702	54.18	Pass
	4	12.706	55.77	Pass
	MAX.	12.709	55.83	-

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

Over Charge (T7)				
	Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle fully state

Charge	17	12.321	25.21	Pass
	18	12.229	25.09	Pass
	19	12.241	25.03	Pass
	20	12.235	25.93	Pass
	MAX.	12.321	25.93	-

Test Condition
- Max. Charge Current : 3800 mA - CC/CV 2Imax(7600mA) 22V cut-off 24Hr

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

B. 50th cycle fully state

Charge	9	12.662	55.75	Pass
	10	12.670	54.17	Pass
	11	12.650	55.19	Pass
	12	12.665	54.98	Pass
	MAX.	12.670	55.75	-

Requirement
- Temperature < 170 (°C) - No disassembly, no rupture, no fire within 6 hours

Over Charge (T7)				
	Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result

B. 50th cycle fully state

Charge	21	12.308	25.26	Pass
	22	12.305	25.39	Pass
	23	12.301	25.63	Pass
	24	12.303	25.11	Pass
	MAX.	12.308	25.63	-

Requirement
- No disassembly, no fire within 7 day

3-3. T6 Test Result (ICP653864L1)

Impact (T6)			
Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result

A. 1st cycle 50% charged state

1	3.817	104.77	Pass
2	3.816	99.06	Pass
3	3.817	101.42	Pass
4	3.817	100.71	Pass
5	3.817	101.62	Pass
6	3.818	117.34	Pass
7	3.816	116.08	Pass
8	3.817	120.94	Pass
9	3.818	109.56	Pass
10	3.817	122.99	Pass
MAX.	3.818	122.99	-

Test Condition
- $\Phi=15.8\text{mm}$ bar, 9.1kg mass, $61\pm 2.5\text{cm}$ height

Requirement
- Temperature < 170 (°C) - No disassembly, no rupture, no fire within 6 hours

4. Sample Image

