
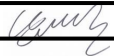



문서번호	QAE-EF02-110923-PKL11L6Y01	
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UN Test Report

- L11L6Y01, ASM P/N 45N1048 (Nom. 48Wh, 10.8V) -

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 **LG Chem**
Mobile Energy Division

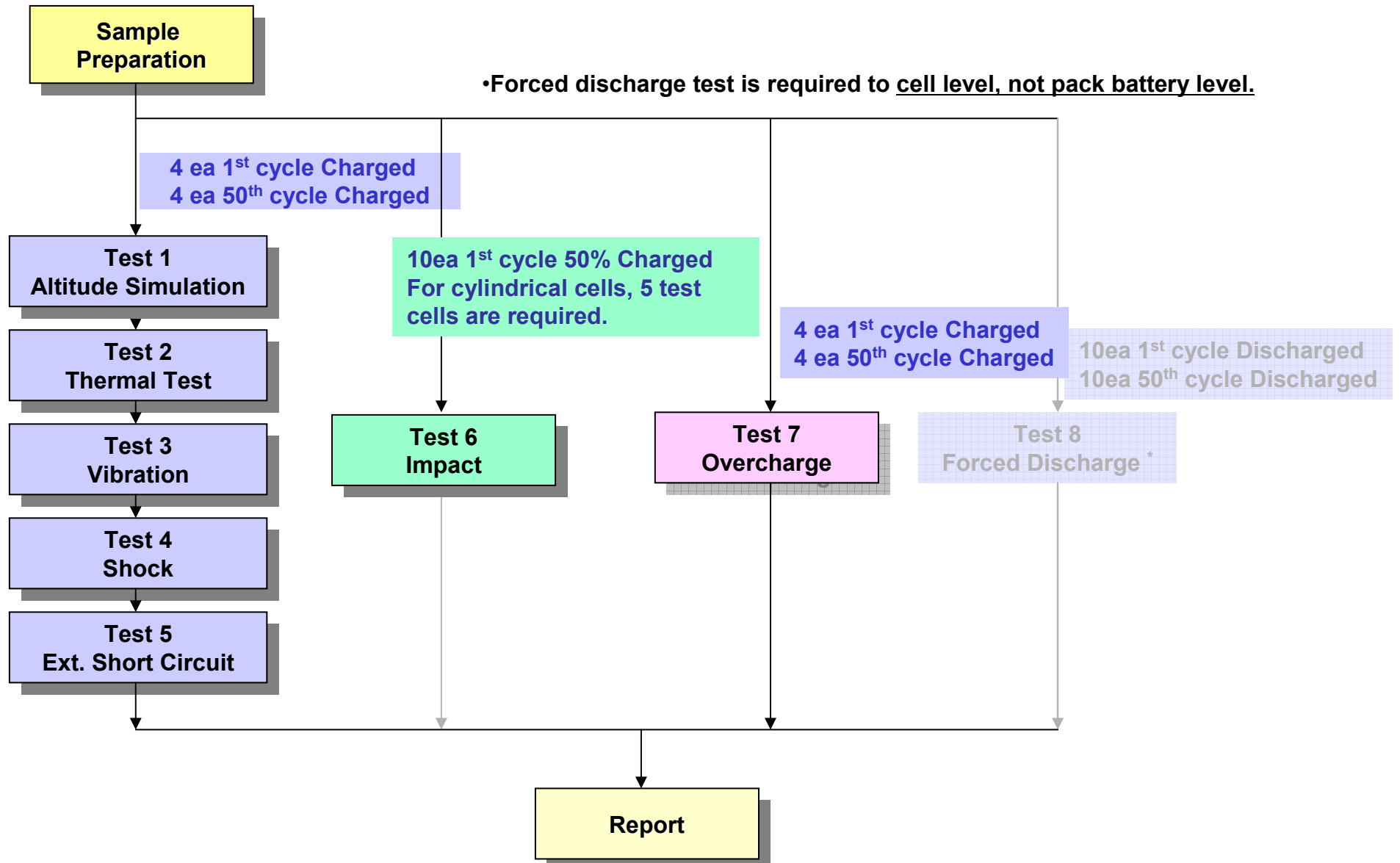
1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5℃	<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℃,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℃	<ul style="list-style-type: none"> - No disassembly, no rupture, no fire (after 6 hours) - Temp. monitoring (max. 170℃)
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)	- No disassembly, no fire (after 7 days)
Test 8. Forced Discharge	Only for Cell, not battery.	- 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	12.199	323.827	12.190	323.817	99.93	0.003	Pass	12.082	323.812	99.11	0.002	Pass	12.078	323.802	99.97	0.003	Pass	12.077	323.795	99.99	0.002	Pass
	2	12.183	323.804	12.173	323.797	99.92	0.002	Pass	12.063	323.788	99.10	0.003	Pass	12.053	323.782	99.92	0.002	Pass	12.053	323.773	100.00	0.003	Pass
	3	12.153	323.854	12.138	323.848	99.88	0.002	Pass	12.030	323.841	99.11	0.002	Pass	12.027	323.838	99.98	0.001	Pass	12.025	323.830	99.98	0.002	Pass
	4	12.189	323.867	12.181	323.860	99.93	0.002	Pass	12.073	323.856	99.11	0.001	Pass	12.071	323.852	99.98	0.001	Pass	12.070	323.849	99.99	0.001	Pass
	Ave.	12.181	323.838	12.171	323.831	99.91	0.002	-	12.062	323.824	99.11	0.002	-	12.057	323.819	99.96	0.002	-	12.056	323.812	99.99	0.002	-

B. 50th cycle fully state

Charge	5	12.183	323.843	12.180	323.834	99.98	0.003	Pass	12.077	323.830	99.15	0.001	Pass	12.070	323.822	99.94	0.002	Pass	12.069	323.818	99.99	0.001	Pass
	6	12.192	323.823	12.182	323.818	99.92	0.002	Pass	12.074	323.812	99.11	0.002	Pass	12.065	323.808	99.93	0.001	Pass	12.063	323.800	99.98	0.002	Pass
	7	12.138	323.869	12.131	323.860	99.94	0.003	Pass	12.022	323.855	99.10	0.002	Pass	12.013	323.851	99.93	0.001	Pass	12.012	323.843	99.99	0.002	Pass
	8	12.175	323.851	12.166	323.849	99.93	0.001	Pass	12.060	323.844	99.13	0.002	Pass	12.057	323.837	99.98	0.002	Pass	12.057	323.827	100.00	0.003	Pass
	Ave.	12.172	323.847	12.165	323.840	99.94	0.002	-	12.058	323.835	99.12	0.002	-	12.051	323.830	99.94	0.002	-	12.050	323.822	99.99	0.002	-

Requirement

- 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

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	12.077	55.49	Pass
	2	12.053	55.05	Pass
	3	12.025	54.85	Pass
	4	12.070	55.28	Pass
	MAX.	12.077	55.49	-

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	9	12.182	25.10	Pass
	10	12.212	25.03	Pass
	11	12.182	24.85	Pass
	12	12.191	25.13	Pass
	MAX.	12.212	25.13	-

Test Condition				
- Max. Charge Current : 2800 mA - CC/CV 2Imax(5600mA) 22V cut-off 24Hr				

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

B. 50th cycle fully state

Charge	5	12.069	55.65	Pass
	6	12.063	54.75	Pass
	7	12.012	55.09	Pass
	8	12.057	55.36	Pass
	MAX.	12.069	55.65	-

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	13	12.162	24.91	Pass
	14	12.175	24.75	Pass
	15	12.180	25.03	Pass
	16	12.171	25.09	Pass
	MAX.	12.180	25.09	-

Requirement				
- No disassembly, no fire within 7 day				

3-3. T6 Test Result (ICR18650S3)

Impact (T6)			
Pack NO.	Initial OCV(V)	Max. Temp (°C)	Result
A. 1st cycle 50% charge state			
C-1	3.677	25.53	Pass
C-2	3.676	25.51	Pass
C-3	3.678	24.71	Pass
C-4	3.675	25.28	Pass
C-5	3.679	24.61	Pass
MAX.	3.679	25.53	-
Test Condition			
- Φ =15.8mm bar, 9.1kg mass, 61±2.5cm height			
Requirement			
- Temperature < 170 (°C) - No disassembly, no rupture, no fire within 6 hours			

4. Sample Image

