
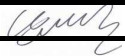



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UN Test Report

- L12L4P62(52Wh, 7.4V) -

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 **LG Chem**
Mobile Energy Division

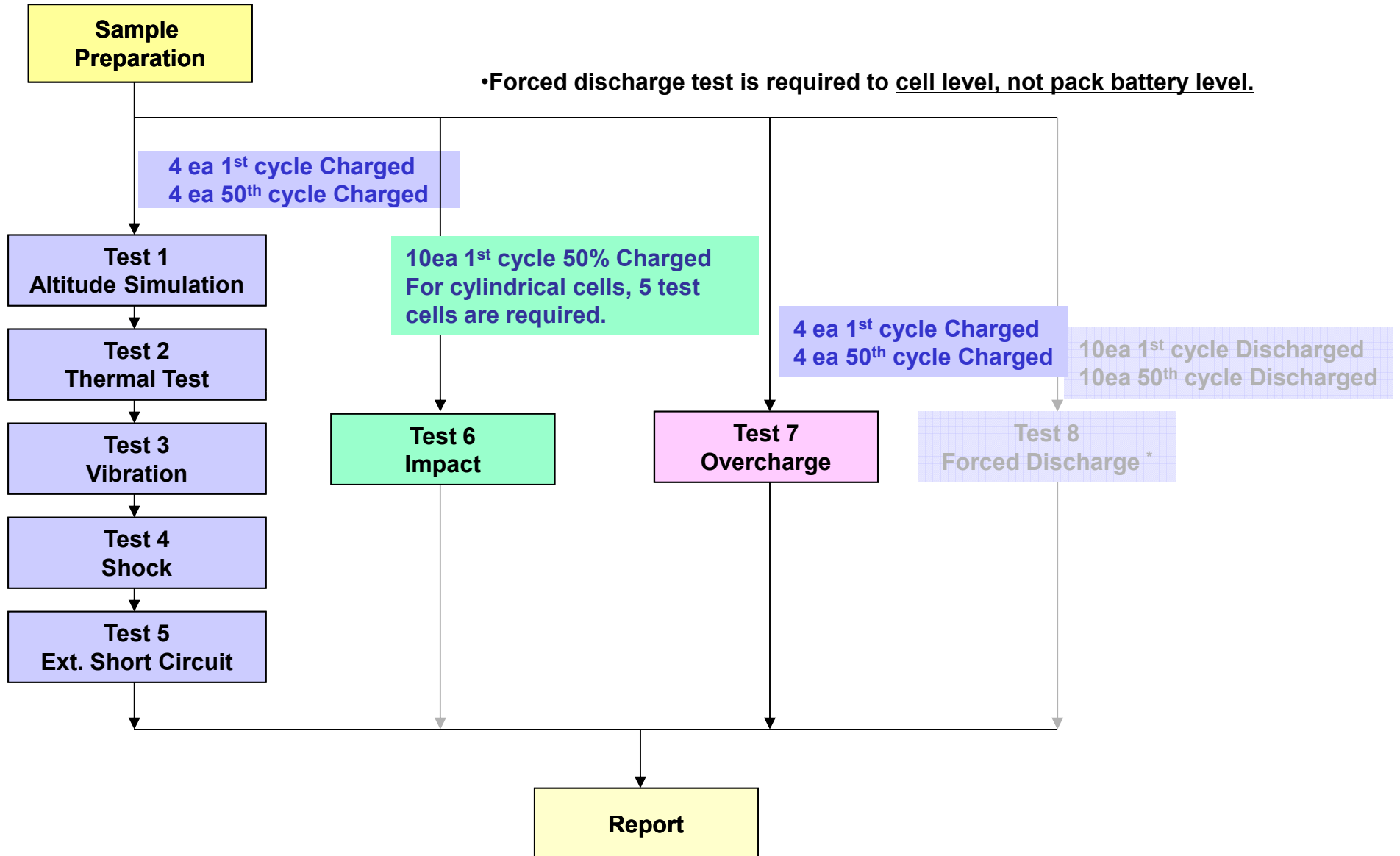
1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure) 11.6kPa for 6hr at 20+/-5°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	8.343	292.888	8.330	292.878	99.85	0.003	Pass	8.251	292.870	99.04	0.003	Pass	8.234	292.865	99.80	0.002	Pass	8.224	292.849	99.87	0.006	Pass
	2	8.341	292.347	8.331	292.346	99.88	0.000	Pass	8.248	292.340	99.00	0.002	Pass	8.237	292.323	99.86	0.006	Pass	8.221	292.303	99.82	0.007	Pass
	3	8.345	292.051	8.335	292.033	99.88	0.006	Pass	8.255	292.015	99.04	0.006	Pass	8.241	291.997	99.83	0.006	Pass	8.228	291.992	99.84	0.002	Pass
	4	8.342	292.525	8.326	292.512	99.80	0.004	Pass	8.247	292.495	99.05	0.006	Pass	8.233	292.487	99.83	0.003	Pass	8.224	292.479	99.89	0.003	Pass
	Ave.	8.343	292.453	8.330	292.442	99.85	0.004	-	8.250	292.430	99.04	0.004	-	8.236	292.418	99.83	0.004	-	8.224	292.406	99.86	0.004	-

B. 50th cycle fully state

Charge	1	8.321	292.147	8.305	292.146	99.82	0.000	Pass	8.223	292.122	99.01	0.008	Pass	8.207	292.107	99.80	0.005	Pass	8.194	292.091	99.85	0.006	Pass
	2	8.339	292.890	8.326	292.886	99.85	0.001	Pass	8.249	292.868	99.07	0.006	Pass	8.233	292.864	99.81	0.001	Pass	8.220	292.842	99.84	0.008	Pass
	3	8.338	292.550	8.327	292.545	99.86	0.002	Pass	8.247	292.527	99.04	0.006	Pass	8.235	292.525	99.86	0.001	Pass	8.225	292.511	99.88	0.005	Pass
	4	8.320	292.243	8.305	292.219	99.82	0.008	Pass	8.226	292.195	99.04	0.008	Pass	8.212	292.190	99.83	0.002	Pass	8.203	292.182	99.89	0.003	Pass
	Ave.	8.329	292.457	8.316	292.449	99.84	0.003	-	8.236	292.428	99.04	0.007	-	8.222	292.422	99.83	0.002	-	8.211	292.406	99.86	0.005	-

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	8.224	55.31	Pass
	2	8.221	54.45	Pass
	3	8.228	54.30	Pass
	4	8.224	54.09	Pass
	MAX.	8.228	55.31	-

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	8.314	25.98	Pass
	10	8.319	25.39	Pass
	11	8.366	24.22	Pass
	12	8.340	24.70	Pass
	MAX.	8.366	25.98	-

Test Condition
- Max. Charge Current : 4970mA - CC/CV 2Imax(9940mA) 16.8V cut-off 24Hr

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

B. 50th cycle fully state

Charge	1	8.194	55.92	Pass
	2	8.220	55.15	Pass
	3	8.225	55.54	Pass
	4	8.203	54.62	Pass
	MAX.	8.225	55.92	-

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	8.290	24.65	Pass
	14	8.322	24.22	Pass
	15	8.314	25.31	Pass
	16	8.286	24.79	Pass
	MAX.	8.322	25.31	-

Requirement
- No disassembly, no fire within 7 day

3-3. T6 Test Result (ICP605585L1)

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

A. 1st cycle 50% charged state

Flat	1	3.789	115.63	Pass
	2	3.790	115.71	Pass
	3	3.789	114.45	Pass
	4	3.789	55.31	Pass
	5	3.790	44.22	Pass
Vertical	6	3.789	90.29	Pass
	7	3.789	126.21	Pass
	8	3.384	107.83	Pass
	9	3.788	105.56	Pass
	10	3.787	89.05	Pass
MAX.		3.790	126.21	-

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



4. Sample Image

