LG Chem, Ltd.
128, Yeoui-daero, Yeongdeungpo-gu,
Seoul, Korea

Certification & Evaluation Team
Tel: 82-42-870-6195, Fax: 82-42-863-0182
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CERTIFICATE OF COMPLIANCE

The following product has been evaluated according to the 5th revised edition Amendment2 of the UN Manual of Tests and Criteria.

We, LG Chem. Ltd hereby certify that this battery meets the requirements of the regulation for transportation of lithium-ion cells and batteries and single cell batteries.

☐ Lithium-ion cell ☑ Lithium-ion battery ☐ Lithium-ion single cell battery	
Model name	**L14L4E01**
Cell Model name	**ICR18650C2**
Nominal voltage	**14.88 V**
Electric power capacity	**41 Wh**
Lithium equivalent content	**3.180 g**

Conducted By: Dae Ho Nam

Manager
Certification & Evaluation
LG Chem, Ltd.
E-mail: kkammy@lgchem.com

Reviewed By: Byung Soo Kim

General Manager
Certification & Evaluation
LG Chem, Ltd.
E-mail: bskim@lgchem.com

문서번호	QAE-EF02-141120-PKL14L4E01	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	이재승	
Approved	김병수	

SolutionPartner

UN Test Report
- L14L4E01 (Nom.41Wh, 14.88V)-

목 차

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LG Chem

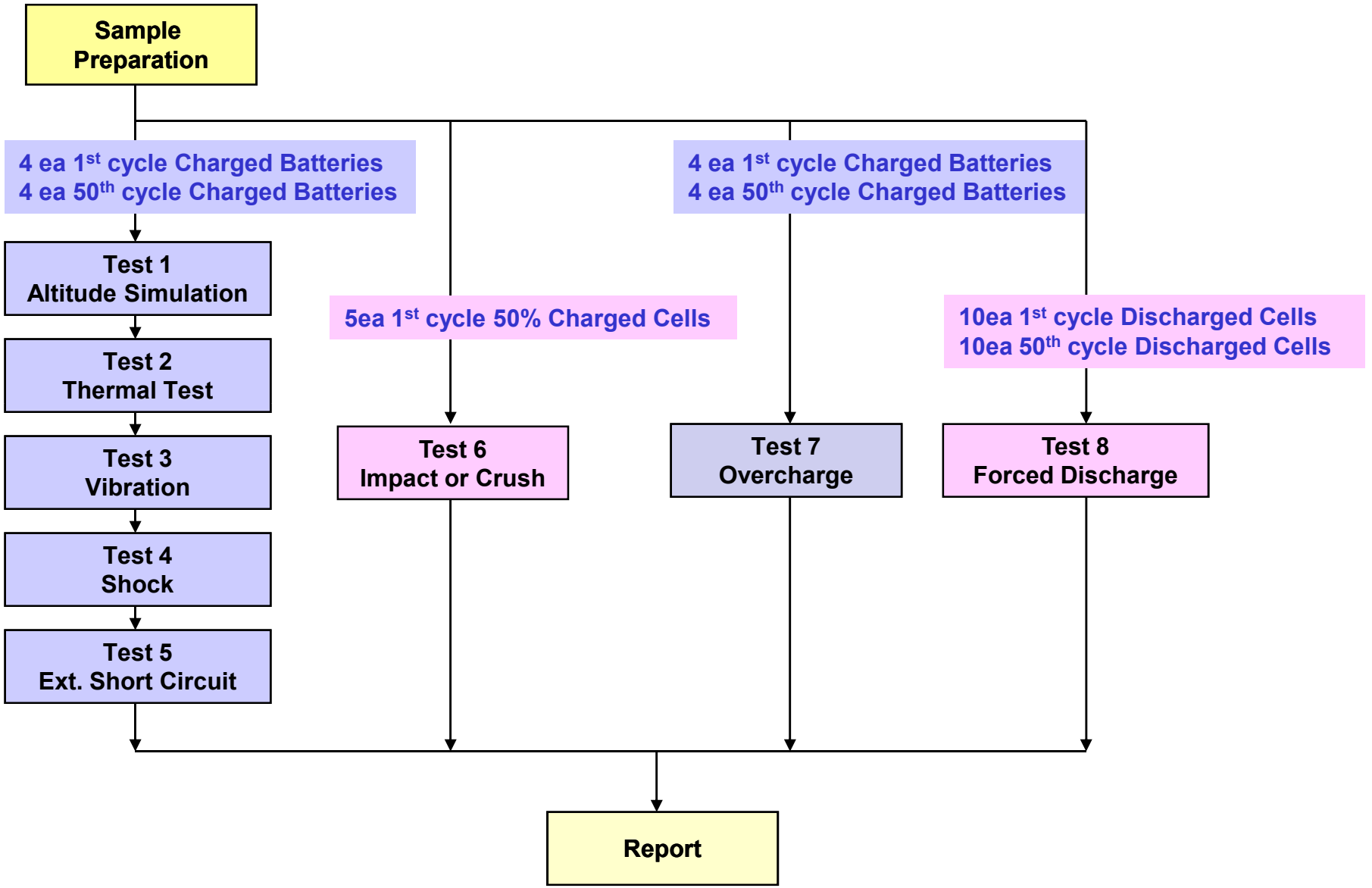
1. UN Transportation Regulation Test

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	17.182	203.164	17.154	203.139	99.84	0.012	Pass	16.908	203.139	98.57	0.000	Pass	16.715	203.124	98.86	0.007	Pass	16.421	203.118	98.24	0.003	Pass
	2	17.149	203.356	17.117	203.338	99.81	0.009	Pass	16.864	203.328	98.52	0.005	Pass	16.665	203.324	98.82	0.002	Pass	16.368	203.299	98.22	0.012	Pass
	3	17.149	203.118	17.123	203.093	99.85	0.012	Pass	16.881	203.089	98.59	0.002	Pass	16.691	203.066	98.87	0.011	Pass	16.406	203.046	98.29	0.010	Pass
	4	17.140	203.102	17.105	203.078	99.80	0.012	Pass	16.863	203.069	98.59	0.004	Pass	16.675	203.067	98.89	0.001	Pass	16.375	203.057	98.20	0.005	Pass
	Ave.	17.155	203.185	17.125	203.162	99.82	0.011	-	16.879	203.156	98.56	0.003	-	16.687	203.145	98.86	0.005	-	16.393	203.130	98.24	0.008	-
B. 50th cycle fully state																							
Charge	5	17.167	203.723	17.138	203.710	99.83	0.006	Pass	16.896	203.709	98.59	0.000	Pass	16.699	203.701	98.83	0.004	Pass	16.399	203.677	98.20	0.012	Pass
	6	17.156	203.069	17.131	203.060	99.85	0.004	Pass	16.890	203.058	98.59	0.001	Pass	16.696	203.055	98.85	0.001	Pass	16.403	203.052	98.25	0.001	Pass
	7	17.162	203.857	17.133	203.853	99.83	0.002	Pass	16.885	203.838	98.55	0.007	Pass	16.691	203.830	98.85	0.004	Pass	16.391	203.829	98.20	0.000	Pass
	8	17.153	203.778	17.127	203.767	99.85	0.005	Pass	16.883	203.766	98.58	0.000	Pass	16.693	203.755	98.87	0.005	Pass	16.407	203.753	98.29	0.001	Pass
	Ave.	17.160	203.607	17.132	203.598	99.84	0.005	-	16.889	203.593	98.58	0.002	-	16.695	203.585	98.85	0.004	-	16.400	203.578	98.23	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 state				
Charge	1	16.421	55.29	Pass
	2	16.368	56.60	Pass
	3	16.406	55.23	Pass
	4	16.375	55.06	Pass
	MAX.	16.421	56.60	-

EXT.Short Circuit (T5)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully state				
Charge	5	16.399	56.02	Pass
	6	16.403	55.22	Pass
	7	16.391	55.41	Pass
	8	16.407	55.43	Pass
	MAX.	16.407	56.02	-

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	17.148	24.82	Pass
	10	17.141	24.01	Pass
	11	17.142	23.35	Pass
	12	17.142	24.70	Pass
	MAX.	17.148	24.82	-

Over Charge (T7)				
	NO.	Initial OCV(V)	Max. Temp (℃)	Result
B. 50th cycle fully state				
Charge	13	17.121	24.92	Pass
	14	17.128	24.06	Pass
	15	17.122	24.83	Pass
	16	17.125	23.49	Pass
	MAX.	17.128	24.92	-

Test Condition
- Max. Charge Current : 1350mA - CC/CV 2Imax(2700mA) 22V cut-off 24Hr

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

3-3. T6/T8 Test Result (ICR18650C2)

Crush (T6)				
Direction	NO.	Initial OCV(V)	Max. Temp (℃)	Result
A. 1st cycle 50% charged state (Direction :Flat)				
Flat	C-1	3.794	22.63	Pass
	C-2	3.795	22.85	Pass
	C-3	3.794	22.65	Pass
	C-4	3.793	22.63	Pass
	C-5	3.794	22.82	Pass
MAX.		3.795	22.82	-

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	75.59	Pass
C-7	3.281	72.54	Pass
C-8	3.269	71.53	Pass
C-9	3.281	73.29	Pass
C-10	3.278	71.78	Pass
C-11	3.291	76.31	Pass
C-12	3.231	73.57	Pass
C-13	3.233	75.00	Pass
C-14	3.233	73.99	Pass
C-15	3.238	73.90	Pass
MAX.	3.291	76.31	-
B. 50th cycle fully discharged state			
C-16	3.354	73.47	Pass
C-17	3.352	70.88	Pass
C-18	3.366	74.03	Pass
C-19	3.359	69.94	Pass
C-20	3.365	72.75	Pass
C-21	3.371	74.64	Pass
C-22	3.354	74.05	Pass
C-23	3.354	74.47	Pass
C-24	3.355	70.81	Pass
C-25	3.388	74.03	Pass
MAX.	3.388	74.64	-

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

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

4. Sample Image