



**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 Amendment 2 of the UN Manual of Tests and Criteria.

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




<input checked="" type="checkbox"/> Lithium-ion cell <input type="checkbox"/> Lithium-ion battery <input type="checkbox"/> Lithium-ion single cell battery	
Model name	<b>ICP415279L1</b>
Capacity	<b>Min. 2390mAh</b>
Nominal voltage	<b>3.8 V</b>
Type of Cell	<b>Polymer</b>

Conducted By: Dae Ho Nam

Manager  
Certification & Evaluation  
LG Chem. Ltd  
E-mail: [kkammy@lgchem.com](mailto:kkammy@lgchem.com)

Reviewed By: Byung Soo Kim

General Manager  
Certification & Evaluation  
LG Chem. Ltd  
E-mail: [bskim@lgchem.com](mailto:bskim@lgchem.com)

문서번호	QAE-EF02-150506-PO415279L1	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	우민제	
Approved	김병수	

**SolutionPartner**

# UN Test Report

## - ICP415279L1 (Min. 2390mAh) -

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2015. 05. 06

 **LG Chem**

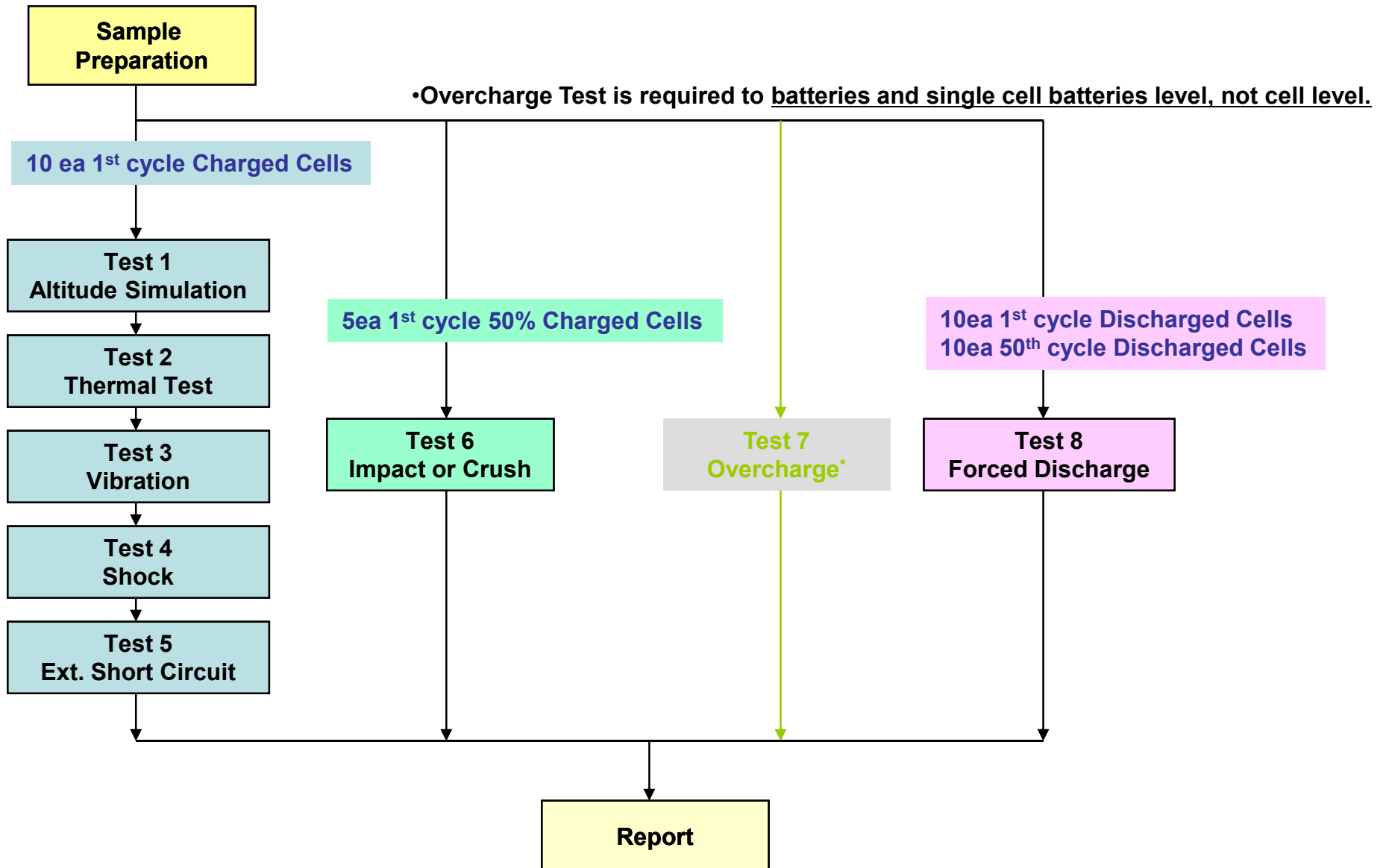
# 1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5℃	<ul style="list-style-type: none"> <li>- Measuring mass before/ after each test (If M&lt;1g, less than 0.5%, If 1g≤M≤75g, less than 0.2%, If M&gt;75g, less than 0.1%)</li> <li>- Measuring voltage before/ after each test (more than 90%)</li> <li>- No leakage, no venting, no disassembly, no rupture, no fire</li> </ul>
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℃	
Test 6. Impact for cylindrical cells (> 18mm diameter)	Φ=15.8mm bar, 9.1kg mass, 61±2.5cm height	<ul style="list-style-type: none"> <li>- No disassembly, no fire within 6 hours after the test</li> <li>- Temp. monitoring (max. 170℃)</li> </ul>
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	Only for battery, not cell.	<ul style="list-style-type: none"> <li>- Overcharge Test is required to pack battery level, not cell level.</li> </ul>
Test 8. Forced Discharge	Discharge at max. discharge current (with 12V DC power supply), Duration time = rated capacity/initial test current	<ul style="list-style-type: none"> <li>- No disassembly, no fire within 7 days after the test</li> </ul>

\* 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 charged state

1	4.324	37.079	4.317	37.079	99.84	0.000	Pass	4.249	37.068	98.42	0.030	Pass	4.248	37.067	99.98	0.003	Pass	4.247	37.066	99.98	0.003	Pass
2	4.324	36.788	4.317	36.787	99.84	0.003	Pass	4.248	36.773	98.40	0.038	Pass	4.247	36.771	99.98	0.005	Pass	4.247	36.770	100.00	0.003	Pass
3	4.324	36.929	4.317	36.929	99.84	0.000	Pass	4.248	36.929	98.40	0.000	Pass	4.247	36.929	99.98	0.000	Pass	4.247	36.927	100.00	0.005	Pass
4	4.324	37.161	4.317	37.161	99.84	0.000	Pass	4.249	37.159	98.42	0.005	Pass	4.247	37.158	99.95	0.003	Pass	4.246	37.157	99.98	0.003	Pass
5	4.324	37.028	4.317	37.027	99.84	0.003	Pass	4.249	37.025	98.42	0.005	Pass	4.248	37.024	99.98	0.003	Pass	4.247	37.022	99.98	0.005	Pass
6	4.324	37.051	4.317	37.050	99.84	0.003	Pass	4.249	37.049	98.42	0.003	Pass	4.248	37.049	99.98	0.000	Pass	4.247	37.049	99.98	0.000	Pass
7	4.324	36.945	4.317	36.943	99.84	0.005	Pass	4.248	36.940	98.40	0.008	Pass	4.247	36.939	99.98	0.003	Pass	4.246	36.938	99.98	0.003	Pass
8	4.324	36.992	4.317	36.991	99.84	0.003	Pass	4.248	36.989	98.40	0.005	Pass	4.247	36.988	99.98	0.003	Pass	4.247	36.987	100.00	0.003	Pass
9	4.324	36.975	4.317	36.973	99.84	0.005	Pass	4.248	36.968	98.40	0.014	Pass	4.248	36.967	100.00	0.003	Pass	4.248	36.965	100.00	0.005	Pass
10	4.324	36.890	4.317	36.889	99.84	0.003	Pass	4.249	36.884	98.42	0.014	Pass	4.248	36.884	99.98	0.000	Pass	4.247	36.882	99.98	0.005	Pass
<b>Ave.</b>	4.324	36.984	4.317	36.983	99.84	0.002	-	4.249	36.978	98.41	0.012	-	4.248	36.978	99.98	0.002	-	4.247	36.976	99.99	0.004	-

<b>Requirement</b>	<ul style="list-style-type: none"> <li>- Measuring mass before/after each test (If <math>M &gt; 75g</math>, less than 0.1%, <math>1g \leq M \leq 75</math>, less than 0.2%, <math>M &lt; 1g</math>, less than 0.5%)</li> <li>- Measuring voltage before/after each test (more than 90%, only charged samples)</li> <li>- No leakage, no venting, no disassembly, no rupture, no fire</li> </ul>
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# 3-2. T5/T6/T8 Test Result

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

### A. 1st cycle fully charged state

1	4.247	105.02	Pass
2	4.247	97.56	Pass
3	4.247	94.17	Pass
4	4.246	93.98	Pass
5	4.247	94.92	Pass
6	4.247	105.43	Pass
7	4.246	100.79	Pass
8	4.247	97.26	Pass
9	4.248	91.42	Pass
10	4.247	96.17	Pass
<b>MAX.</b>	4.248	105.43	-

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

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

Crush (T6)				
Direction	NO.	Initial OCV(V)	Max. Temp (°C)	Result

### A. 1st cycle 50% charged state

Flat	11	3.840	19.76	Pass
	12	3.840	19.44	Pass
	13	3.840	19.29	Pass
	14	3.842	19.36	Pass
	15	3.841	19.48	Pass
<b>MAX.</b>		3.842	19.76	-

Test Condition
- Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation

Requirement
- Temperature ≤ 170 (°C) - No disassembly, no fire within 6 hours after the test

Forced Discharge (T8)			
NO.	Initial OCV(V)	Max. Temp (°C)	Result

### A. 1st cycle fully discharged state

16	3.252	39.49	Pass
17	3.249	43.89	Pass
18	3.248	42.40	Pass
19	3.251	40.76	Pass
20	3.253	44.48	Pass
21	3.251	37.16	Pass
22	3.233	42.94	Pass
23	3.247	43.58	Pass
24	3.248	41.95	Pass
25	3.247	43.84	Pass
<b>MAX.</b>	3.253	44.48	-

### B. 50th cycle fully discharged state

26	3.305	33.82	Pass
27	3.306	42.45	Pass
28	3.305	45.94	Pass
29	3.304	43.66	Pass
30	3.310	45.26	Pass
31	3.304	38.70	Pass
32	3.309	37.84	Pass
33	3.307	40.69	Pass
34	3.305	41.29	Pass
35	3.305	39.81	Pass
<b>MAX.</b>	3.310	45.94	-

Test Condition
- Discharge at max. discharge current (with 12V DC power supply) : 2390mA Duration time: rated capacity (60min )

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

## 4. Sample Image

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