



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.




<input type="checkbox"/> Lithium-ion cell <input type="checkbox"/> Lithium-ion battery <input checked="" type="checkbox"/> Lithium-ion single cell battery	
Model name	WX30
Cell Model name	ICP332829L1
Nominal voltage	3.8 V
Electric power capacity	1.2 Wh

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-EF02-140408-PKWX30	
Prepared	남익현	
	장승현	
Reviewed	남대호	
	박해나	
Approved	김병수	

SolutionPartner

UN Test Report

- WX30(Nom.1.2Wh, 3.8V) -

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2014. 04. 08



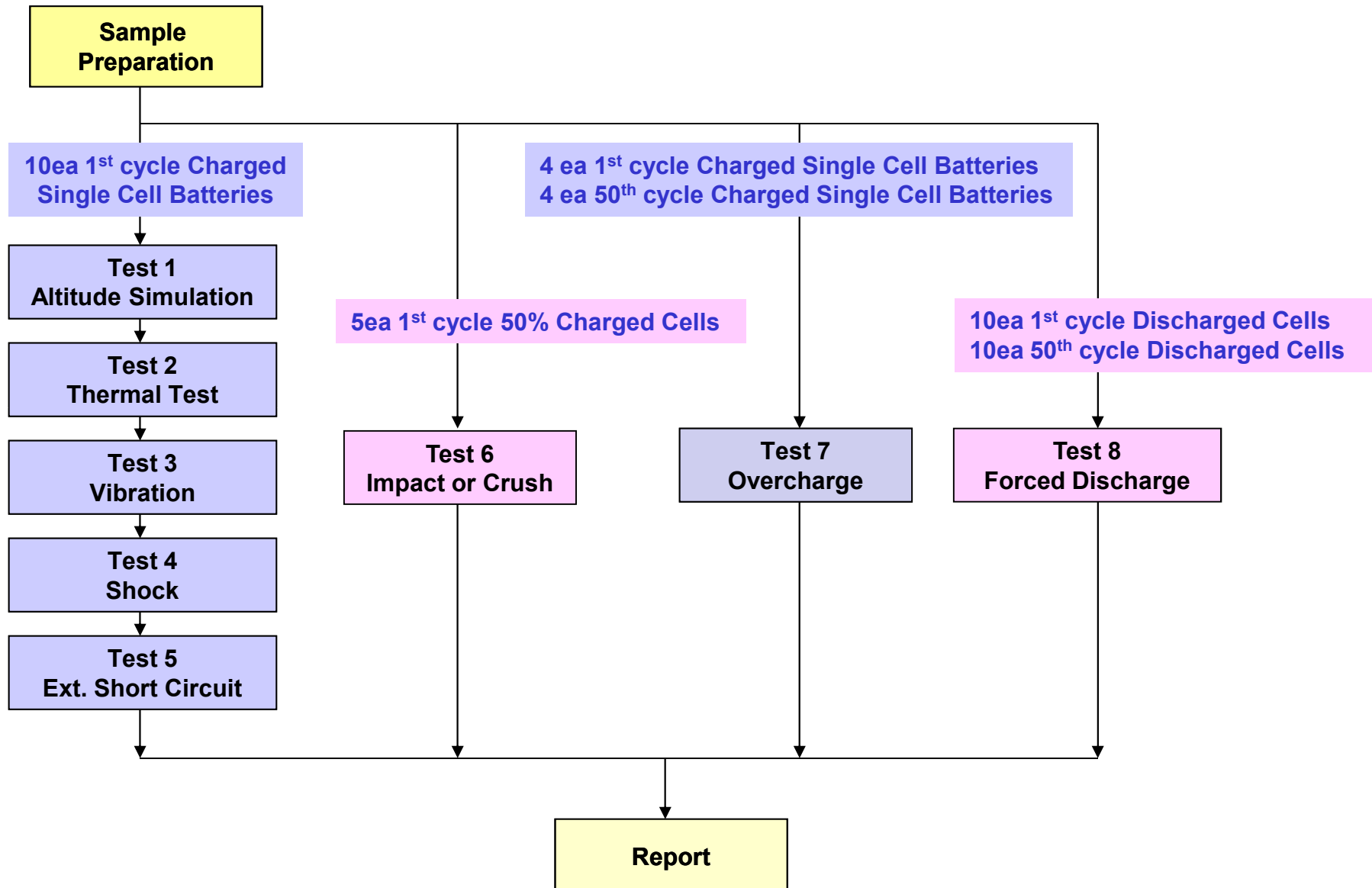
1. UN Transportation Regulation Test

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℃	
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 charged state

1	4.323	5.659	4.322	5.659	99.98	0.002	Pass	4.263	5.659	98.63	0.004	Pass	4.262	5.659	99.98	0.002	Pass	4.261	5.659	99.98	0.004	Pass
2	4.322	5.644	4.321	5.644	99.98	0.002	Pass	4.261	5.644	98.61	0.000	Pass	4.260	5.644	99.98	0.002	Pass	4.259	5.644	99.98	0.000	Pass
3	4.322	5.635	4.321	5.635	99.98	0.000	Pass	4.259	5.635	98.57	0.002	Pass	4.258	5.635	99.98	0.004	Pass	4.257	5.634	99.98	0.005	Pass
4	4.323	5.643	4.321	5.643	99.95	0.004	Pass	4.262	5.643	98.63	0.000	Pass	4.261	5.643	99.98	0.002	Pass	4.259	5.643	99.95	0.002	Pass
5	4.322	5.636	4.321	5.636	99.98	0.002	Pass	4.260	5.635	98.59	0.004	Pass	4.259	5.635	99.98	0.000	Pass	4.258	5.635	99.98	0.002	Pass
6	4.324	5.638	4.323	5.638	99.98	0.002	Pass	4.259	5.638	98.52	0.000	Pass	4.258	5.638	99.98	0.000	Pass	4.257	5.638	99.98	0.004	Pass
7	4.323	5.639	4.322	5.639	99.98	0.000	Pass	4.258	5.639	98.52	0.002	Pass	4.257	5.639	99.98	0.002	Pass	4.256	5.639	99.98	0.002	Pass
8	4.322	5.644	4.320	5.644	99.95	0.002	Pass	4.259	5.644	98.59	0.000	Pass	4.257	5.644	99.95	0.002	Pass	4.256	5.644	99.98	0.000	Pass
9	4.322	5.618	4.321	5.618	99.98	0.004	Pass	4.261	5.618	98.61	0.002	Pass	4.260	5.618	99.98	0.000	Pass	4.259	5.618	99.98	0.002	Pass
10	4.323	5.640	4.322	5.640	99.98	0.002	Pass	4.264	5.639	98.66	0.002	Pass	4.262	5.639	99.95	0.002	Pass	4.260	5.639	99.95	0.002	Pass
Ave.	4.323	5.640	4.321	5.640	99.97	0.002	-	4.261	5.639	98.59	0.001	-	4.259	5.639	99.97	0.001	-	4.258	5.639	99.97	0.002	-

Requirement

- Measuring mass before/after each test (If $M > 75g$, less than 0.1%, $1g \leq M \leq 75$, 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 (°C)	Result

A. 1st cycle fully charged state

1	4.261	53.44	Pass
2	4.259	54.82	Pass
3	4.257	55.60	Pass
4	4.259	53.28	Pass
5	4.258	54.26	Pass
6	4.257	52.02	Pass
7	4.256	56.29	Pass
8	4.256	53.72	Pass
9	4.259	54.67	Pass
10	4.260	55.66	Pass
MAX.	4.261	56.29	-

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

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

A. 1st cycle fully state

Charge	11	4.324	23.32	Pass
	12	4.322	22.52	Pass
	13	4.323	22.74	Pass
	14	4.323	21.83	Pass
	MAX.	4.324	23.32	-

Test Condition
- Max. Charge Current : 310mA - CC/CV 2Imax(620mA) 8.7V cut-off 24Hr

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

B. 50th cycle fully state

Charge	15	4.323	24.29	Pass
	16	4.324	22.28	Pass
	17	4.323	21.68	Pass
	18	4.322	23.38	Pass
	MAX.	4.324	24.29	-

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

3-3. T6/T8 Test Result (ICP332829L1)

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

A. 1st cycle 50% charged state Direction

Flat	C-1	3.823	26.28	Pass
	C-2	3.823	27.90	Pass
	C-3	3.824	26.73	Pass
	C-4	3.823	28.88	Pass
	C-5	3.824	25.76	Pass
MAX.		3.823	27.11	-

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

C-6	3.215	48.51	Pass
C-7	3.210	49.41	Pass
C-8	3.213	48.54	Pass
C-9	3.216	49.50	Pass
C-10	3.215	47.56	Pass
C-11	3.211	48.52	Pass
C-12	3.214	49.50	Pass
C-13	3.216	46.52	Pass
C-14	3.210	48.51	Pass
C-15	3.209	48.52	Pass
MAX.	3.216	48.51	-

B. 50th cycle fully discharged state

C-16	3.330	53.42	Pass
C-17	3.321	51.84	Pass
C-18	3.318	54.25	Pass
C-19	3.322	52.19	Pass
C-20	3.332	52.34	Pass
C-21	3.331	51.51	Pass
C-22	3.312	53.65	Pass
C-23	3.332	51.28	Pass
C-24	3.335	53.78	Pass
C-25	3.320	52.84	Pass
MAX.	3.335	52.71	-

Test Condition
- Discharge at max. discharge current : 310mA (with 12V DC power supply), Duration time: rated capacity (60.0min)

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

4. Sample Image

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