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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	FX30
Cell Model name	ICP336494L1
Nominal voltage	3.8 V
Electric power capacity	10.7 Wh

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SolutionPartner

UN Test Report

- FX30(Min. 10.7Wh, 3.8V) -

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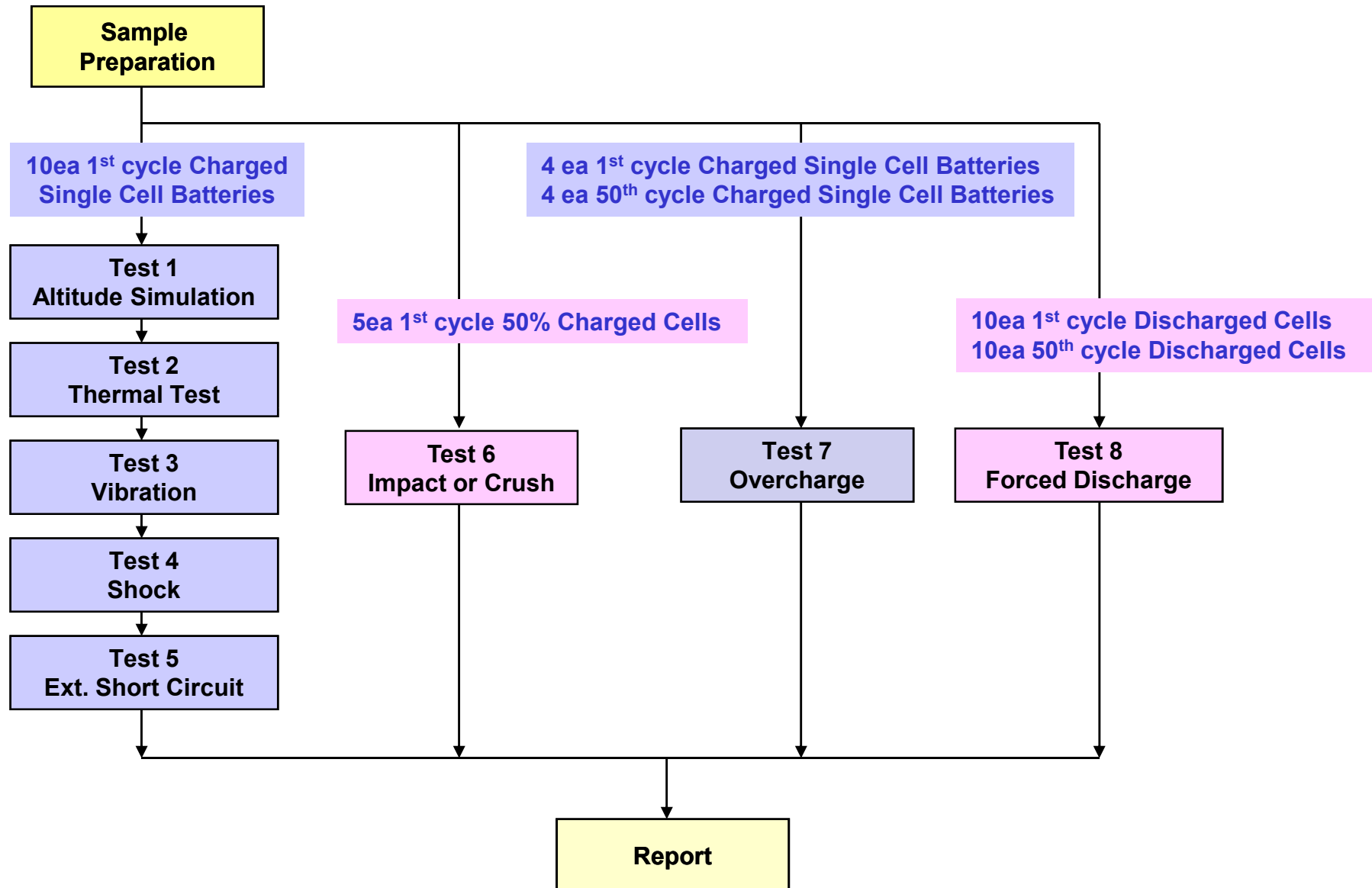
1. UN Transportation Regulation Test

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 $1g \leq M \leq 75g$, 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 10 cycle 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 charged state

1	4.366	46.046	4.365	46.045	99.98	0.002	Pass	4.313	46.044	98.81	0.002	Pass	4.313	46.043	100.00	0.002	Pass	4.312	46.042	99.98	0.002	Pass
2	4.365	46.043	4.365	46.043	100.00	0.000	Pass	4.312	46.043	98.79	0.000	Pass	4.312	46.043	100.00	0.000	Pass	4.311	46.043	99.98	0.000	Pass
3	4.366	46.045	4.365	46.045	99.98	0.000	Pass	4.314	46.045	98.83	0.000	Pass	4.313	46.044	99.98	0.002	Pass	4.313	46.043	100.00	0.002	Pass
4	4.364	46.045	4.364	46.044	100.00	0.002	Pass	4.311	46.043	98.79	0.002	Pass	4.311	46.043	100.00	0.000	Pass	4.311	46.043	100.00	0.000	Pass
5	4.364	46.046	4.364	46.045	100.00	0.002	Pass	4.312	46.044	98.81	0.002	Pass	4.311	46.043	99.98	0.002	Pass	4.310	46.043	99.98	0.000	Pass
6	4.365	46.045	4.365	46.045	100.00	0.000	Pass	4.313	46.045	98.81	0.000	Pass	4.312	46.044	99.98	0.002	Pass	4.312	46.043	100.00	0.002	Pass
7	4.366	46.044	4.364	46.044	99.95	0.000	Pass	4.311	46.043	98.79	0.002	Pass	4.311	46.043	100.00	0.000	Pass	4.311	46.043	100.00	0.000	Pass
8	4.366	46.044	4.366	46.043	100.00	0.002	Pass	4.312	46.043	98.76	0.000	Pass	4.312	46.043	100.00	0.000	Pass	4.311	46.042	99.98	0.002	Pass
9	4.365	46.045	4.364	46.044	99.98	0.002	Pass	4.312	46.044	98.81	0.000	Pass	4.311	46.044	99.98	0.000	Pass	4.311	46.044	100.00	0.000	Pass
10	4.366	46.045	4.365	46.045	99.98	0.000	Pass	4.311	46.044	98.76	0.002	Pass	4.311	46.043	100.00	0.002	Pass	4.310	46.043	99.98	0.000	Pass
Ave.	4.365	46.045	4.365	46.044	99.99	0.001	-	4.312	46.044	98.79	0.001	-	4.312	46.043	99.99	0.001	-	4.311	46.043	99.99	0.001	-

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	4.312	54.17	Pass
2	4.311	53.67	Pass
3	4.313	53.17	Pass
4	4.311	53.14	Pass
5	4.310	53.76	Pass
6	4.312	54.67	Pass
7	4.311	53.14	Pass
8	4.311	54.12	Pass
9	4.311	53.99	Pass
10	4.310	54.41	Pass
MAX.	4.313	54.67	-

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

A. 1st cycle fully charged state

Charge	11	4.365	22.15	Pass
	12	4.366	24.51	Pass
	13	4.365	23.65	Pass
	14	4.365	24.72	Pass
	MAX.	4.366	24.72	-

Test Condition	
- Max. Charge Current : 2900mA - CC/CV 2Imax(5800mA) 8.8V cut-off 24Hr	

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

B. 50th cycle fully charged state

Charge	15	4.365	22.16	Pass
	16	4.364	23.76	Pass
	17	4.364	24.11	Pass
	18	4.365	23.88	Pass
	MAX.	4.365	24.11	-

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

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

3-3. T6/T8 Test Result (ICP336494L1)

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

A. 1st cycle 50% charged state

Flat	C-1	3.792	23.22	Pass
	C-2	3.795	23.93	Pass
	C-3	3.789	22.81	Pass
	C-4	3.791	23.72	Pass
	C-5	3.788	23.97	Pass
MAX.		3.795	23.97	-

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	3.019	48.13	Pass
C-7	3.012	47.22	Pass
C-8	3.016	47.98	Pass
C-9	3.012	47.24	Pass
C-10	3.011	48.33	Pass
C-11	3.016	48.12	Pass
C-12	3.013	46.87	Pass
C-13	3.017	46.69	Pass
C-14	3.011	47.82	Pass
C-15	3.015	46.74	Pass
MAX.	3.019	48.33	-

B. 50th cycle fully discharged state

C-16	3.116	43.45	Pass
C-17	3.121	43.26	Pass
C-18	3.119	42.73	Pass
C-19	3.114	43.87	Pass
C-20	3.121	43.54	Pass
C-21	3.125	44.12	Pass
C-22	3.122	45.84	Pass
C-23	3.129	45.12	Pass
C-24	3.127	45.82	Pass
C-25	3.122	43.90	Pass
MAX.	3.129	45.84	-

Test Condition	
- Discharge at max. discharge current : 2900mA (with 12V DC power supply), Duration time: rated capacity (60min)	

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

4. Sample Image



보조1. 1.2m Drop Test Report

A. Test Result

No	Name of Test Items	Standard requirement or The Clause Number of Standard	Test Result		Conclusion
1	1.2m Drop Test	* UNITED NATIONS “Recommendations on the TRANSPORT OF DANGEROUS GOODS” Model Regulations(18 th) special provisions 188	Face	The package is not cracked, the contents are not damaged and not shifted.	Passed
			Edge	The package is not cracked, the contents are not damaged and not shifted.	
			Angle	The package is not cracked, the contents are not damaged and not shifted.	
2	Gross Weight Measure	* UNITED NATIONS “Recommendations on the TRANSPORT OF DANGEROUS GOODS” Model Regulations(18 th) special provisions 188	7.456kg		Passed

B. Sample Description

Dimensions	400×300×87mm	Net Weight of Batteries	5.5kg	Battery Type	Rechargeable Li-ion Battery
Gross weight	7.456kg	Battery number	120Pcs/Carton	** Description	Covered by Styrofoam

C. Image After Test



* Recommendations on the transport of dangerous goods as below
Each package of cells or batteries, or the completed package must be capable of withstanding a 1.2 m drop test in any orientation without:

- 1) damage to cells or batteries contained therein
- 2) shifting of the contents so as to allow battery to battery (or cell to cell) contact
- 3) release of contents.

** Description: Description about the protection of short-circuit

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