
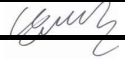



문서번호	QAE-EF02-120329-PKAP12D8K	
Prepared	김홍일	
	남익현	
	장승현	
Reviewed	남대호	
	이재승	
Approved	정준용	

SolutionPartner

UN Test Report

- AP12D8K (Nom. 27Wh, 3.7V) -

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 **LG Chem**
Mobile Energy Division

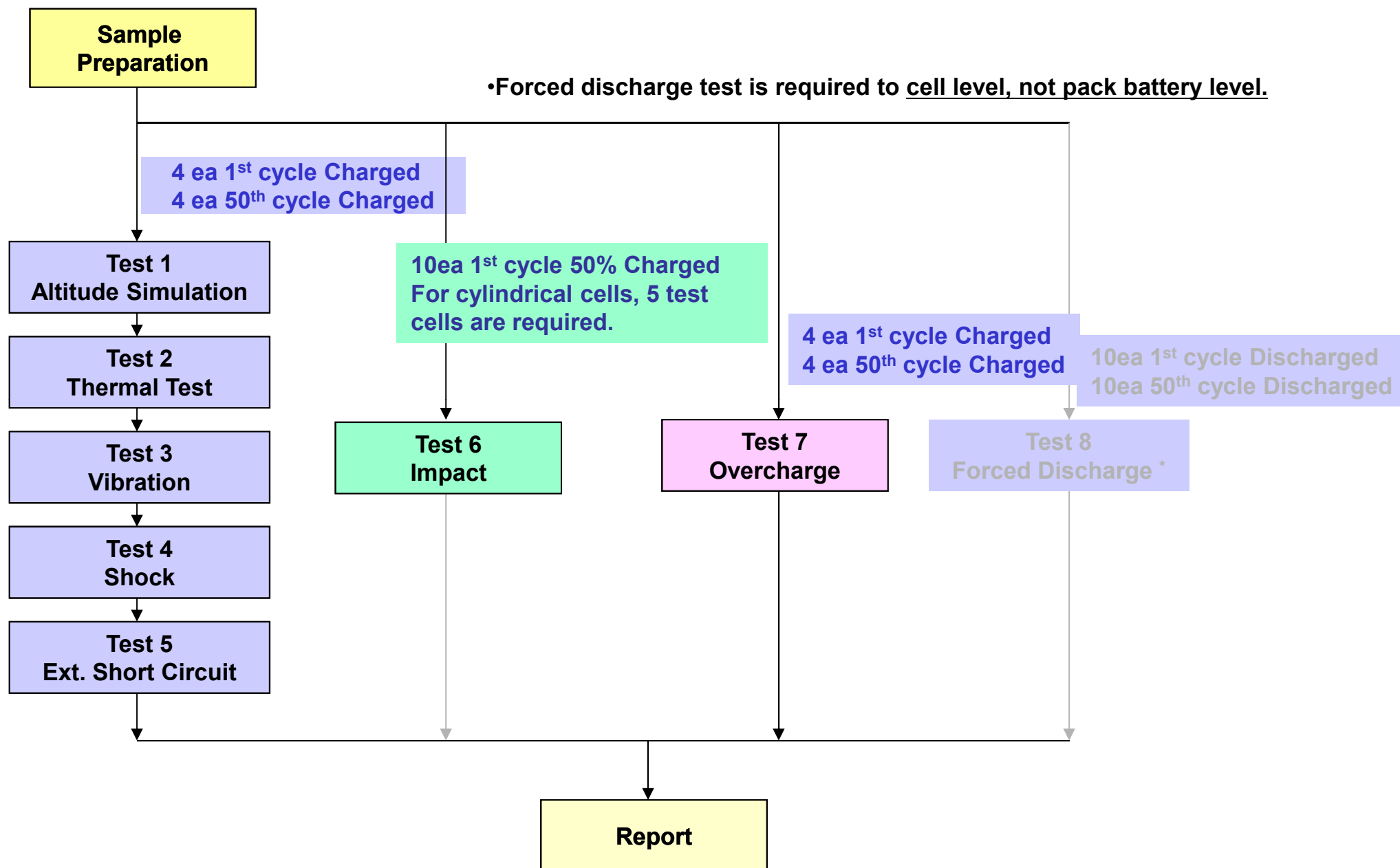
1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure) 11.6kPa for 6hr at 20+/-5℃	<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℃, 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℃	<ul style="list-style-type: none"> - No disassembly, no rupture, no fire (after 6 hours) - Temp. monitoring (max. 170℃)
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)	- No disassembly, no fire (after 7 days)
Test 8. Forced Discharge	Only for Cell, not battery.	- 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	4.140	129.80	4.136	129.80	99.90	0.000	Pass	4.132	129.80	99.90	0.000	Pass	4.128	129.80	99.90	0.000	Pass	4.127	129.80	99.98	0.000	Pass
	2	4.141	129.20	4.140	129.10	99.98	0.077	Pass	4.133	129.10	99.83	0.000	Pass	4.127	129.10	99.85	0.000	Pass	4.122	129.10	99.88	0.000	Pass
	3	4.140	129.40	4.140	129.30	100.00	0.077	Pass	4.133	129.30	99.83	0.000	Pass	4.127	129.30	99.85	0.000	Pass	4.122	129.30	99.88	0.000	Pass
	4	4.142	129.80	4.140	129.70	99.95	0.077	Pass	4.137	129.70	99.93	0.000	Pass	4.132	129.70	99.88	0.000	Pass	4.128	129.70	99.90	0.000	Pass
	Ave.	4.141	129.55	4.139	129.48	99.96	0.058	-	4.134	129.48	99.87	0.000	-	4.129	129.48	99.87	0.000	-	4.125	129.48	99.91	0.000	-

B. 50th cycle fully state

Charge	5	4.141	129.80	4.133	129.80	99.81	0.000	Pass	4.129	129.80	99.90	0.000	Pass	4.123	129.80	99.85	0.000	Pass	4.114	129.80	99.78	0.000	Pass
	6	4.140	129.20	4.135	129.20	99.88	0.000	Pass	4.130	129.10	99.88	0.077	Pass	4.123	129.10	99.83	0.000	Pass	4.115	129.10	99.81	0.000	Pass
	7	4.140	129.40	4.135	129.40	99.88	0.000	Pass	4.130	129.30	99.88	0.077	Pass	4.123	129.30	99.83	0.000	Pass	4.115	129.30	99.81	0.000	Pass
	8	4.142	129.80	4.142	129.80	100.00	0.000	Pass	4.137	129.70	99.88	0.077	Pass	4.134	129.70	99.93	0.000	Pass	4.126	129.70	99.81	0.000	Pass
	Ave.	4.141	129.55	4.136	129.55	99.89	0.000	-	4.132	129.48	99.89	0.058	-	4.126	129.48	99.86	0.000	-	4.118	129.48	99.80	0.000	-

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	4.127	21.70	Pass
	2	4.122	22.86	Pass
	3	4.122	55.57	Pass
	4	4.128	56.09	Pass
	MAX.	4.128	56.09	-

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	4.134	22.11	Pass
	10	4.114	21.70	Pass
	11	4.118	22.86	Pass
	12	4.121	21.57	Pass
	MAX.	4.134	22.86	-

Test Condition	
- Max. Charge Current : 3182 mA - CC/CV 2Imax(6364mA) 8.4V cut-off 24Hr	

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

B. 50th cycle fully state

Charge	5	4.114	21.41	Pass
	6	4.115	22.57	Pass
	7	4.115	55.61	Pass
	8	4.126	55.87	Pass
	MAX.	4.126	55.87	-

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	4.123	22.84	Pass
	14	4.112	22.87	Pass
	15	4.111	21.41	Pass
	16	4.116	22.57	Pass
	MAX.	4.123	22.87	-

Requirement	
- No disassembly, no fire within 7 day	

3-3. T6 Test Result (ICP3483103L1)

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

A. 1st cycle 50% charged state

Direction

Flat	C-1	3.827	90.12	Pass
	C-2	3.845	99.56	Pass
	C-3	3.837	100.01	Pass
	C-4	3.853	96.67	Pass
	C-5	3.855	92.05	Pass
Vertical	C-6	3.862	114.48	Pass
	C-7	3.863	102.88	Pass
	C-8	3.842	101.35	Pass
	C-9	3.839	108.35	Pass
	C-10	3.836	99.98	Pass
	MAX.	3.863	114.48	-

Test Condition

- Φ =15.8mm bar, 9.1kg mass, 61 ± 2.5 cm height

Requirement

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

4. Sample Image

