




문서번호	QAE-EF02-131114-PKASMPN45N1748	
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UN Test Report

- ASM P/N 45N1748(34Wh, 7.4V) -

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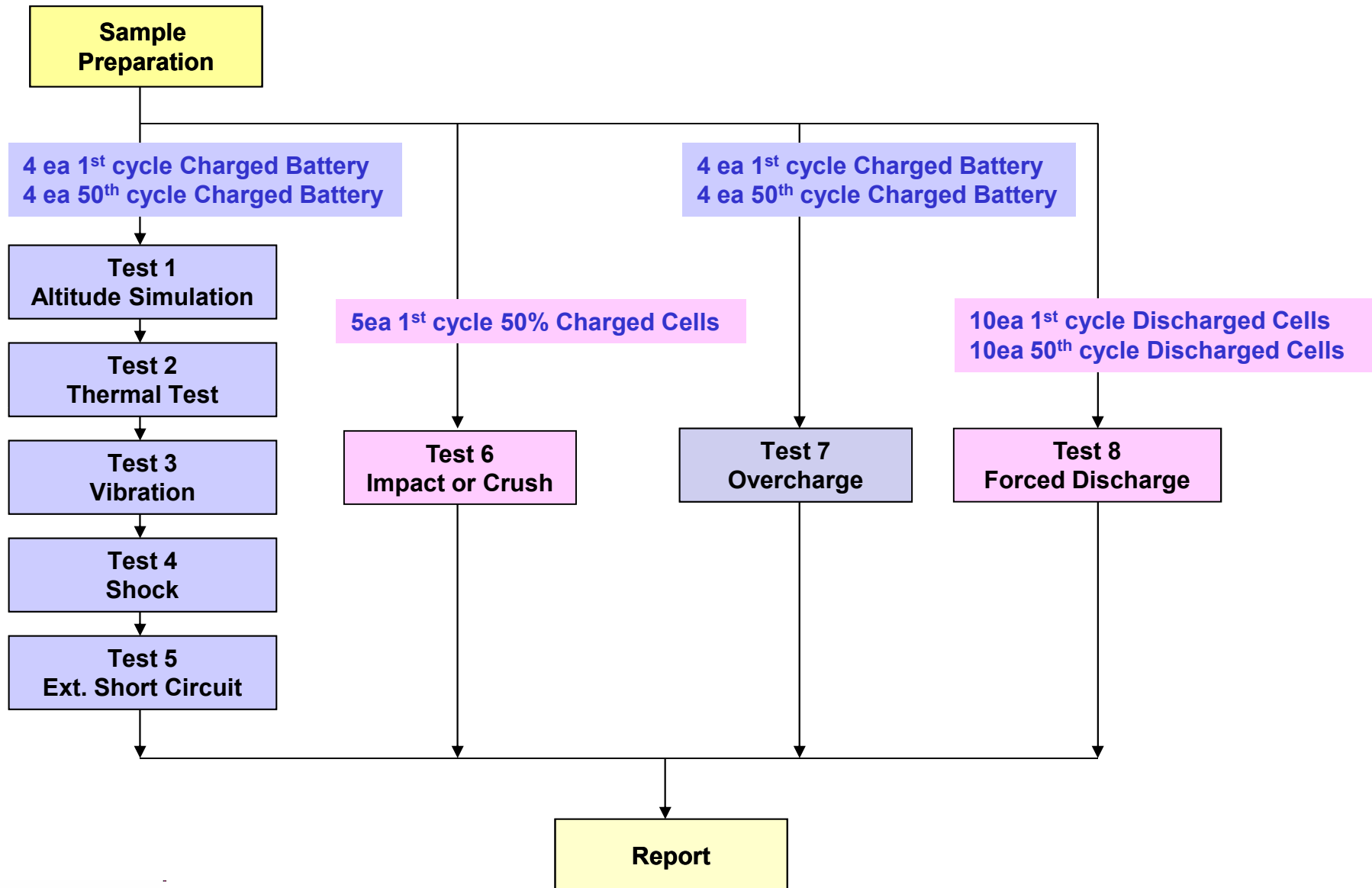
1. UN Transportation Regulation Test

Test	Condition	Requirements
Test 1. Altitude Simulation	Storing at (low pressure)11.6kPa for 6hr at 20+/-5 °C	
Test 2. Thermal Test	[72± 2 °C,6hr ↔ -40 ± 2 °C,6hr,interval max. 30min] x 10cycle Storing at 20± 5 °C for 24h	- Measuring mass before/ after each test (If M>5g, less than 0.1%)
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	- Measuring voltage before/ after each test (more than 90%) - No leakage, no venting, no disassembly, no rupture, no fire
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 °C 1hr continue after returning at 55± 2 °C	- No disassembly, no rupture, no fire (after 6 hours) - Temp. monitoring (max. 170 °C)
Test 6. Impact for cylindrical cells (> 20mm diameter)	Φ=15.8mm bar, 9.1kg mass, 61± 2.5cm height	- No disassembly, no rupture, no fire (after 6 hours)
Test 6. Crush for cylindrical cells (≤ 20mm diameter) for prismatic, pouch, coin/button cells	Crushing rate :1.5cm/s, until 13kN±0.78kN or 100mV drop or 50% deformation	- Temp. monitoring (max. 170 °C)
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	Discharge at max. discharge current (with 12V DC power supply), Duration time = rated capacity/initial test current	- Appearance picture before/ after test (after 7 days) - Temp. monitoring (max. 170 °C)

* 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/Amd.1)

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	8.348	176.847	8.334	176.842	99.84	0.003	Pass	8.252	176.820	99.01	0.012	Pass	8.244	176.797	99.90	0.013	Pass	8.233	176.783	99.87	0.008	Pass
	2	8.349	176.745	8.339	176.737	99.88	0.005	Pass	8.260	176.723	99.06	0.008	Pass	8.247	176.701	99.84	0.013	Pass	8.233	176.689	99.83	0.006	Pass
	3	8.342	176.746	8.333	176.731	99.89	0.009	Pass	8.250	176.712	99.00	0.011	Pass	8.238	176.697	99.86	0.008	Pass	8.225	176.692	99.84	0.003	Pass
	4	8.348	176.484	8.336	176.463	99.86	0.012	Pass	8.256	176.461	99.04	0.001	Pass	8.240	176.459	99.80	0.001	Pass	8.227	176.449	99.84	0.006	Pass
	Ave.	8.347	176.706	8.336	176.693	99.87	0.007	-	8.255	176.679	99.03	0.008	-	8.242	176.664	99.85	0.009	-	8.230	176.653	99.85	0.006	-

B. 50th cycle fully state

Charge	5	8.329	176.283	8.318	176.263	99.86	0.012	Pass	8.235	176.244	99.00	0.011	Pass	8.221	176.221	99.83	0.013	Pass	8.212	176.201	99.90	0.011	Pass
	6	8.341	176.260	8.331	176.236	99.88	0.014	Pass	8.251	176.230	99.04	0.003	Pass	8.237	176.224	99.82	0.003	Pass	8.226	176.207	99.87	0.009	Pass
	7	8.328	176.657	8.311	176.655	99.80	0.001	Pass	8.235	176.655	99.08	0.000	Pass	8.223	176.635	99.87	0.011	Pass	8.209	176.618	99.83	0.010	Pass
	8	8.347	176.957	8.331	176.944	99.81	0.008	Pass	8.254	176.921	99.07	0.013	Pass	8.245	176.900	99.89	0.012	Pass	8.232	176.876	99.85	0.013	Pass
	Ave.	8.336	176.539	8.323	176.524	99.84	0.009	-	8.244	176.512	99.05	0.007	-	8.231	176.495	99.85	0.010	-	8.220	176.476	99.86	0.011	-

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	8.233	55.69	Pass
	2	8.233	55.57	Pass
	3	8.225	55.61	Pass
	4	8.227	55.26	Pass
	MAX.	8.233	55.69	-

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	8.399	25.99	Pass
	10	8.348	25.34	Pass
	11	8.313	25.86	Pass
	12	8.312	25.25	Pass
	MAX.	8.399	25.99	-

Test Condition
- Max. Charge Current : 3800 mA - CC/CV 2Imax(7600mA) 16.8 V cut-off 24Hr

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

B. 50th cycle fully state

Charge	5	8.212	54.99	Pass
	6	8.226	54.55	Pass
	7	8.209	54.23	Pass
	8	8.232	54.46	Pass
	MAX.	8.232	54.99	-

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	8.379	25.57	Pass
	14	8.289	25.90	Pass
	15	8.371	25.47	Pass
	16	8.292	25.03	Pass
	MAX.	8.379	25.90	-

Requirement
- No disassembly, no fire within 7 day

3-3. T6 Test Result (ICP505070L1)

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

A. 1st cycle 50% charged state

Direction

		Initial OCV(V)	Max. Temp (°C)	Result
Flat	1	4.167	26.45	Pass
	2	4.168	27.27	Pass
	3	4.169	28.51	Pass
	4	4.169	26.74	Pass
	5	4.166	28.67	Pass
MAX.		4.169	28.67	-

Test Condition

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

Requirement

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

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

A. 1st cycle fully Discharged state

1	3.289	69.88	Pass
2	3.290	81.34	Pass
3	3.287	75.28	Pass
4	3.295	90.48	Pass
5	3.287	74.75	Pass
6	3.293	80.86	Pass
7	3.300	83.18	Pass
8	3.293	83.59	Pass
9	3.312	78.80	Pass
10	3.293	85.01	Pass
MAX.	3.312	90.48	-

B. 50th cycle fully discharged state

1	3.653	73.22	Pass
2	3.684	101.00	Pass
3	3.645	90.28	Pass
4	3.671	97.70	Pass
5	3.660	92.67	Pass
6	3.654	77.80	Pass
7	3.651	86.00	Pass
8	3.659	97.04	Pass
9	3.692	93.52	Pass
10	3.693	93.21	Pass
MAX.	3.693	101.00	-

Test Condition

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

Requirement

- No disassembly, no fire within 7 days

4. Sample Image

