



Result of UN test for Lithium ion Battery (361-00167-00)

Preparation	Review	Approval
		

Jan. 03, 2024



routejade

The energy storage company, Creative

Test Summary

Model	361-00167-00
Description	Lithium ion Battery, 0.357Wh, 2.0g
Report No.	RJD-Q-240103-01
Date	Jan 3, 2024



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Manual of Tests and Criteria (38.3 Lithium ion batteries)

No.	Test Name	Criterion	Result
T1	Altitude simulation	No leakage / No venting / No disassembly / No rupture / No fire / No explosion Voltage retention > 90%	PASS
T2	Thermal test		PASS
T3	Vibration		PASS
T4	Shock		PASS
T5	External short circuit	No disassembly / No rupture / No fire / No explosion Max. temp < 170°C	PASS
T6	Impact / Crush	No disassembly / No fire / No explosion Max. temp < 170°C	N/A
T7	Overcharge	No Fire / No Disassembly	PASS
T8	Forced Discharge		N/A

**We declare that the above-mentioned test is the result of being checked according to UN test.
(UN Manual of Tests and Criteria, ST/SG/AC.10/11/Rev7/Amd-1, Part III, sub-section 38.3)**

T1. Altitude simulation

Test Procedure

Test batteries are stored at a pressure of 11.6 kPa for six hours at ambient temperature (20±5°C)

Requirement

The battery should not explode or catch fire and no mass loss, no leakage, no venting, no disassembly, no rupture is found. For fully charged test battery, the voltage retention should be greater than 90% of its voltage immediately prior test.

No.	Condition	Voltage (V)			Weight (g)			Result
		Before	After	Ret(%)	Before	After	Loss (g)	
1	Fresh (Fully charged)	4.424	4.422	99.95%	1.726	1.725	-0.001	PASS
2		4.424	4.423	99.97%	1.732	1.731	-0.001	PASS
3		4.424	4.423	99.97%	1.720	1.720	0.000	PASS
4		4.423	4.421	99.96%	1.735	1.734	-0.001	PASS
5	25 cycles (Fully charged)	4.423	4.421	99.96%	1.730	1.730	0.000	PASS
6		4.425	4.424	99.98%	1.755	1.754	-0.001	PASS
7		4.426	4.425	99.97%	1.734	1.734	0.000	PASS
8		4.425	4.423	99.96%	1.748	1.747	-0.001	PASS

T2. Thermal shock

Test Procedure

Test batteries are stored for six hours at 72±2°C, followed by storage for six hours at -40±2°C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all Test batteries are to be stored for 24hours at ambient temperature (20±5°C)

Requirement

The battery should not explode or catch fire and no mass loss, no leakage, no venting, no disassembly, no rupture is found. For fully charged test battery, the voltage retention should be greater than 90% of its voltage immediately prior test.

No.	Condition	Voltage (V)			Weight (g)			Result
		Before	After	Ret(%)	Before	After	Loss (g)	
1	Fresh (Fully charged)	4.422	4.369	98.80%	1.725	1.724	-0.001	PASS
2		4.422	4.369	98.80%	1.731	1.729	-0.002	PASS
3		4.422	4.369	98.80%	1.720	1.717	-0.003	PASS
4		4.421	4.368	98.80%	1.734	1.732	-0.002	PASS
5	25 cycles (Fully charged)	4.421	4.368	98.80%	1.730	1.728	-0.002	PASS
6		4.423	4.371	98.82%	1.754	1.753	-0.001	PASS
7		4.424	4.371	98.80%	1.734	1.731	-0.003	PASS
8		4.423	4.370	98.80%	1.747	1.746	-0.001	PASS

T3. Vibration

Test Procedure

Batteries are vibrated using a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle should be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the Battery.

Requirement

The battery should not explode or catch fire and no mass loss, no leakage, no venting, no disassembly, no rupture is found. For fully charged test battery, the voltage retention should be greater than 90% of its voltage immediately prior test.

No.	Condition	Voltage (V)			Weight (g)			Result
		Before	After	Ret(%)	Before	After	Loss (g)	
1	Fresh (Fully charged)	4.369	4.366	99.93%	1.724	1.724	0.000	PASS
2		4.369	4.367	99.95%	1.729	1.729	0.000	PASS
3		4.369	4.366	99.93%	1.717	1.717	0.000	PASS
4		4.368	4.365	99.93%	1.732	1.732	0.000	PASS
5	25 cycles (Fully charged)	4.368	4.364	99.91%	1.728	1.728	0.000	PASS
6		4.371	4.369	99.95%	1.753	1.753	0.000	PASS
7		4.371	4.369	99.95%	1.731	1.731	0.000	PASS
8		4.370	4.367	99.93%	1.746	1.745	-0.001	PASS

T4. Physical Shock

Test Procedure

Batteries are shocked using a half-sine shock of peak acceleration of 150gn and pulse duration of 6 milliseconds. Each battery should be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the battery for a total of 18 shocks.

Requirement

The battery should not explode or catch fire and no mass loss, no leakage, no venting, no disassembly, no rupture is found. For fully charged test battery, the voltage retention should be greater than 90% of its voltage immediately prior test.

No.	Condition	Voltage (V)			Weight (g)			Result
		Before	After	Ret(%)	Before	After	Loss (g)	
1	Fresh (Fully charged)	4.366	4.366	100.00%	1.724	1.724	0.000	PASS
2		4.367	4.367	100.00%	1.729	1.729	0.000	PASS
3		4.366	4.366	100.00%	1.717	1.717	0.000	PASS
4		4.365	4.365	100.00%	1.732	1.731	-0.001	PASS
5	25 cycles (Fully charged)	4.364	4.363	99.98%	1.728	1.727	-0.001	PASS
6		4.369	4.368	99.98%	1.753	1.753	0.000	PASS
7		4.369	4.369	100.00%	1.731	1.731	0.000	PASS
8		4.367	4.367	100.00%	1.745	1.745	0.000	PASS

T5. External short circuit

Test Procedure

The battery to be tested shall be temperature stabilized so that its external case temperature reaches 57 ± 4 °C and then the battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1ohm at 57 ± 4 °C. This short circuit condition is continued for at least one hour after the battery external case temperature has returned to 57 ± 4 °C. The battery must be observed for a further six hours for the test to be concluded.

Requirement

The battery should not explode or catch fire and the temperature of the battery surface should not exceed 170°C and there is no disassembly, no rupture and no fire within six hours of this test.

No.	Condition	Max. Temp. (°C)	Result
1	Fresh (Fully charged)	55.5	PASS
2		55.6	PASS
3		55.2	PASS
4		55.4	PASS
5	25 cycles (Fully charged)	55.1	PASS
6		55.6	PASS
7		55.4	PASS
8		55.0	PASS

T7. Overcharge

Test Procedure

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. when the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

Requirement

Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

No.	Condition	Result
1	Fresh (Fully discharged)	PASS
2		PASS
3		PASS
4		PASS
5	25 cycles (Fully discharged)	PASS
6		PASS
7		PASS
8		PASS