TEST REPORT

UN Manual of Tests and Criteria,

Part lll, Sub-section 38.3,

Lithium Metal and Lithium ion Batteries

Model : CLH - 14

Test Report Number : CBP211201-01

Dec 01, 2021

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TEST REPORT
UN38.3

TRANSPORT OF DANGEROUS GOODS - Lithium metal and lithium ion batteries

1. General Information

• Apparatus.....:	Lithium Thionyl Chloride(Li/$SOCl_2$) Cell
• Type reference.....:	CLH-14 (Spiral C)
• Ratings.....:	3.6V, 6.0Ah
• Mass.....:	Approx. 52g
• Lithium content (for lithium metal).....:	2.0g
• Wh capacity (for lithium ion).....:	N/A
• Battery connection configuration.....:	S1/P1
• Trade Mark.....:	
• Manufacturer.....:	COROS Battery Co., Ltd. 1104 Choongang Royal Office, 13 Seoun-ro, Seocho-gu, Seoul, Republic of Korea Tel) 82-2-588-4008 Website: www.corosbattery.com
• Test Standard.....:	ST/SG/AC.10/11/Rev.6 Recommendations on the Transport of Dangerous Goods : Manual of Tests and Criteria, Part lll, Sub-Section 38.3 Lithium metal and lithium ion batteries UNITED NATIONS
• Date(s) of performance of tests.....:	2021-09-01 to 2021-11-30
• Date of receipt of test item.....:	2021-12-01

Tested by	Haneul Park (Project Engineer)	
Witnessed by	SukHee Zang (Technical Manager)	
Approved by	SangSun Park (R&D Director)	

2. Technical information

2.1. Summary of test Results

No.	Test Items	Criteria	Results
1	Test T.1 : Altitude Simulation	- No mass loss, no leakage, no venting, no disassembly, no rupture and no fire. - The open circuit voltage of each cells after testing is not less than 90% of its voltage immediately prior to the procedure	PASS
2	Test T.2 : Thermal Test	- No mass loss, no leakage, no venting, no disassembly, no rupture and no fire. - The open circuit voltage of each cells after testing is not less than 90% of its voltage immediately prior to the procedure	PASS
3	Test T.3 : Vibration	- No mass loss, no leakage, no venting, no disassembly, no rupture and no fire. - The open circuit voltage of each cells after testing is not less than 90% of its voltage immediately prior to the procedure	PASS
4	Test T.4 : Shock	- No mass loss, no leakage, no venting, no disassembly, no rupture and no fire. - The open circuit voltage of each cells after testing is not less than 90% of its voltage immediately prior to the procedure	PASS
5	Test T.5 : External Short Circuit	- Their external temperature does not exceed 170 °C and there is no disassembly, no rupture and no fire within six hours of this test.	PASS
6	Test T.6 : Impact/Crush	- Their external temperature does not exceed 170 °C and there is no disassembly and no fire within six hours of this test.	PASS
7	Test T.7 : Over Charge	- There is no disassembly and no fire within seven days of the test.	N/A
8	Test T.8 : Forced Discharge	- There is no disassembly and no fire within seven days of the test.	PASS

2.2.Test environment

* Unless specified otherwise in the individual tests shall be conducted under the following ambient conditions.

- Temperature ..... 20℃± 5℃
- Relative Humidity ..... Not specified
- Air Pressure ..... Not specified
- Altitude of test laboratory ..... Not specified

2.3.Test Instrument list

No.	Equipment	Maker	Model	Remarks
1	Charge/Discharge MC	Maccor	MC-4300	0~10V/-5~5V Accuracy±0.02% (Voltage & current)
2	DVM	Fluke	289	
3	Balance	AND	CB300	Max weight 300g Accurency 0.01g
4	Computer	Samsung		
5	Data Logger	Agilent	34970A	
6	Thermal couple		K type	
7	Vacuum Chamber	JISCO	VO-10X	
8	Heating Chamber	Cleanthermo system		
9	Low Temp. Chamber	ESPEC	SH-661	
10	Vibration Test MC	SAMHAN Tech.	SJTA-2000S	
11	Shock Test MC	SAMHAN Tech.	SJTC-300	
12	Impact Test MC	SAMHAN Tech.		
13	Crush Test MC	Media Tech.		
14	External short circuit device	Corosbattery		under 80mΩ
15	DC Power Supply	VuPower	K3005D	

3. Test Results

3.1. Possible test case verdicts:

-Test case does not apply to the test object..: N/A

-Test object does meet the requirement .....: P (Pass)

-Test object does not meet the requirement....: F (Fail)

3.2. Test Procedure and Requirements

UN 38.3. Lithium metal and Lithium ion batteries			
Clause	Requirement + Test	Result-Remark	Verdict
38.3.3	Assembled battery testing requirements		
38.3.3 (f)	The battery assembly has aggregate lithium content of not more than 500 g (lithium metal type) or with a Watt-hour rating of not more than 6,200 Wh (lithium ion type), and is assembled from batteries that have passed all applicable tests. One assembled battery in a fully charged state is tested under tests T.3, T.4 and T.5, and, in addition, test T.7 in the case of rechargeable battery.		N/A
38.3.3 (g)	Batteries that have passed all applicable tests are electrically connected to form a battery in which the aggregate lithium content is more than 500 g (lithium metal type) or with a Watt-hour rating of more than 6,200 Wh (lithium ion type). The assembled battery is not tested if the assembled battery is of a type that has been verified as preventing: (i) Overcharge; (ii) Short circuits; and (iii) Over discharge between the batteries.		N/A
38.3.4	Transport tests		P
38.3.4.1	Test T-1 : Altitude simulation		P
	Purpose : This test simulates air transport under low-pressure conditions.		P
	Procedure: Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least 6 hours at ambient temperature.		P
	Requirement: Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.		P
	Results: no leakage, no venting, no short-circuit, no rupture, no explosion and no fire during this test.	See appended Table 38.3.4.1	P

UN 38.3. Lithium metal and Lithium ion batteries			
Clause	Requirement + Test	Result-Remark	Verdict
38.3.4.2	Test T-2 : Thermal test		P
	Purpose : This test assesses cell and battery seal integrity and internal electrical connections. The test is conducted using rapid and extreme temperature changes.		P
	Procedure: Test cells and batteries are to be stored for at least 6 hours at a test temperature equal to 72±2℃, followed by storage for at least 6 hr at a test temperature equal to -40±2℃. 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 cells and batteries are to be stored for 24 hr at ambient temperature. Cells or batteries previously subjected to altitude simulation test.		P
	For large cells or batteries the duration of exposure to the test temperatures is at least 12h instead of 6h.		N/A
	Requirement: Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly. no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.		P
	Results: no leakage, no venting, no short-circuit, no rupture, no explosion and no fire during this test.	See appended Table 38.3.4.2	P
38.3.4.3	Test T-3 : Vibration		P
	Purpose : This test simulates vibration during transport.		P
	Procedure: Cells or batteries are subjected to the following sinusoidal vibration with a logarithmic sweep: from 7 Hz a peak acceleration of 1 g_n is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm and the frequency increased until a peak acceleration of 8 g_n occurs (approximately 50 Hz). A peak acceleration of 8 g_n is then maintained until the frequency is increased to 200 Hz. Cells or batteries previously subjected to thermal test		P

UN 38.3. Lithium metal and Lithium ion batteries			
Clause	Requirement + Test	Result-Remark	Verdict
	Large batteries are subjected to the following sinusoidal vibration with a logarithmic sweep: from 7 Hz a peak acceleration of 1 g_n is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm and the frequency increased until a peak acceleration of 2 g_n occurs (approximately 25 Hz). A peak acceleration of 2 g_n is then maintained until the frequency is increased to 200 Hz.		N/A
	Cycle is repeated 12 times for a total of 3 h for each of three mutually perpendicular mounting positions. One of the directions is perpendicular to the terminal face.		P
	Requirement: Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery directly after testing in its third perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.		P
	Results: no leakage, no venting, no short-circuit, no rupture, no explosion and no fire during this test.	See appended Table 38.3.4.3	P
38.3.4.4	Test T-4 : Shock		P
	Purpose : This test assesses the robustness of cells and batteries against cumulative shocks.		P
	Procedure: Cells or batteries are subjected to three shocks in each direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks. Cells are subjected to half-sine shock of peak acceleration of 150 g_n and pulse duration of 6 ms. Cells or batteries previously subjected to vibration test.		P
	As an alternative, large cells are subjected to a half sine shock of peak acceleration of 50 g_n and pulse duration of 11 ms.		N/A
	Small batteries are subjected to half-sine shock of peak acceleration of the smaller of the following and pulse duration of 6 ms: - 150 g_n or - √(100850 / mass in kg) g_n		N/A

UN 38.3. Lithium metal and Lithium ion batteries			
Clause	Requirement + Test	Result-Remark	Verdict
	Large batteries are subjected to half-sine shock of peak acceleration of the smaller of the following and pulse duration of 11 ms: - 50 g_n or - √(30000 / mass in kg) g_n		N/A
	Requirement: Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.		P
	Results: no leakage, no venting, no short-circuit, no rupture, no explosion and no fire during this test.	See appended Table 38.3.4.4	P
38.3.4.5	Test T-5 : External Short-circuit		P
	Purpose : This test simulates an external short circuit.		P
	Procedure: The cell or battery to be tested shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57±4℃, measured on the external case.		P
	Cells or batteries are subjected to a short-circuit condition with a total external resistance of less than 0.1 ohm at 57 ± 4 °C. Short-circuit condition is continued for at least 1 h after the cell or battery external case temperature has returned to 57 ± 4°C, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value. The test sample is observed for a further 6 h. Cells or batteries previously subjected to shock test.		P
	Requirement: Cells and batteries meet this requirement if their external temperature does not exceed 170℃ and there is no disassembly, no rupture and no fire during the test and within six hours after the test.		P
	Results: no excessive temperature rise, no rupture, no explosion and no fire during this test and within the 6 h of observation.	See appended Table 38.3.4.5	P

UN 38.3. Lithium metal and Lithium ion batteries			
Clause	Requirement + Test	Result-Remark	Verdict
38.3.4.6	Test T-6 : Impact/Crush		P
	Purpose: These tests simulate mechanical abuse from an impact or crush that may result in an internal short circuit.		P
	The test is conducted using test cells or component cells that have not been previously subjected to other transport tests.		P
	Each test cell or component cell shall be subjected to one impact / crush only.		P
	Cylindrical cells not less than 20.0 mm in diameter are tested with impact test procedure.		P
	Procedure(Impact): The cell is placed on a flat smooth surface. A stainless steel bar with a diameter of 15.8 ± 0.1 mm and a length of at least 60 mm or of the longest dimension of the cell, whichever is greater, is placed across the centre of the test sample. A mass of 9.1 ± 0.1 kg is dropped from a height of 61 ± 2.5cm at the intersection of the bar and the test sample using a vertical sliding track or channel. The vertical track is oriented 90 degrees from the horizontal supporting surface.		P
	The test sample is impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the steel		P
	Prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter are tested with crush test procedure.		N/A
	Procedure(Crush): The cell is crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact.		N/A
	The crushing is to be continued until one of the three conditions below is reached: - The applied force reaches 13 ± 0.78 kN; - The voltage of the cell drops by at least 100mV; or - The cell is deformed by 50 % or more of its original thickness. As soon as one of the above conditions has been obtained, the pressure shall be released.		N/A
	The test sample shall be observed for a further 6 h.		N/A
	Requirement: Cells and component cells meet this requirement if their external temperature does not exceed 170°C and there is no disassembly and no fire during the test and within six hours after this test		N/A
	Results: no excessive temperature rise, no explosion and no fire during this test and within the 6 h of observation.	See appended Table 38.3.4.6	N/A

UN 38.3. Lithium metal and Lithium ion batteries			
Clause	Requirement + Test	Result-Remark	Verdict
38.3.4.7	Test T-7 : Overcharge		N/A
	Purpose : This test evaluates the ability of a rechargeable battery to withstand an overcharge condition.		N/A
	Procedure: The charge current of the battery is twice the manufacturer's recommended maximum continuous charge current. The manufacturer's recommended charge voltage is not more than 18 V. The minimum voltage of the test is the lesser of two times the maximum charge voltage of the battery or 22 V.		N/A
	The manufacturer's recommended charge voltage is not more than 18 V. The minimum voltage of the test is the lesser of two times the maximum charge voltage of the battery or 22 V.		N/A
	The manufacturer's recommended charge voltage is more than 18 V. The voltage of the test is not less than 1.2 times the maximum charge voltage.		N/A
	Requirement: Rechargeable batteries meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.		N/A
	Results: no explosion and no fire during this test and within the 7 days of observation.		N/A
38.3.4.8.	Test T-8 : Forced discharge		P
	Purpose : This test evaluates the ability of a primary or a rechargeable cell to withstand a forced discharge condition.		P
	Procedure: Each cell is forced discharged at ambient temperature by connecting it in series with a 12 V direct current power supply at an initial current equal to the maximum continuous discharge current specified by the manufacturer. Time interval for discharging equals to rated capacity divided by the initial test current. The test sample is observed for a further 7 days.		P
	Requirement: Primary or rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.		P
	Results: no explosion and no fire during this test, nor within the 7 days of observation.	See appended Table 38.3.4.8	P

UN 38.3.4.1. : Altitude Test			
Clause	Requirement + Test	Result - Remarks	Verdict

Sample No.	Pre-condition	OCV before test (V)	Mass before test (g)	OCV after test (V)	Mass after test (g)	Mass loss (%)	Voltage remain (%)	Results
T1 to T5_1	Fresh	3.674	52.21	3.676	52.21	0	0.05	P
T1 to T5_2	Fresh	3.676	52.16	3.677	52.16	0	0.03	P
T1 to T5_3	Fresh	3.678	52.31	3.679	52.31	0	0.03	P
T1 to T5_4	Fresh	3.675	52.23	3.679	52.23	0	0.11	P
T1 to T5_5	Fresh	3.679	51.9	3.677	51.9	0	0.05	P
T1 to T5_6	Fresh	3.678	52.18	3.68	52.18	0	0.05	P
T1 to T5_7	Fresh	3.675	51.93	3.676	51.93	0	0.03	P
T1 to T5_8	Fresh	3.676	51.99	3.677	51.99	0	0.03	P
T1 to T5_9	Fresh	3.677	52.18	3.677	52.18	0	0	P
T1 to T5_10	Fresh	3.676	51.85	3.678	51.85	0	0.05	P
T1 to T5_11	Full Dis.	3.665	50.42	3.67	50.42	0	0.14	P
T1 to T5_12	Full Dis.	3.661	50.08	3.664	50.08	0	0.08	P
T1 to T5_13	Full Dis.	3.66	50.4	3.664	50.4	0	0.11	P
T1 to T5_14	Full Dis.	3.661	50.11	3.66	50.11	0	0.03	P
T1 to T5_15	Full Dis.	3.656	49.85	3.66	49.85	0	0.11	P
T1 to T5_16	Full Dis.	3.658	49.53	3.663	49.53	0	0.14	P
T1 to T5_17	Full Dis.	3.664	50.17	3.668	50.17	0	0.11	P
T1 to T5_18	Full Dis.	3.66	50.41	3.665	50.41	0	0.14	P
T1 to T5_19	Full Dis.	3.66	50.32	3.664	50.32	0	0.11	P
T1 to T5_20	Full Dis.	3.666	50.92	3.671	50.92	0	0.14	P

☐ Supplementary information:

Precondition:

Full Dis. : Fully discharged state.

Fresh : Undischarged state.

Results:

P : No leakage, no venting, no short-circuit (voltage not remain 90%), no rupture, no disassembly(explosion), and no fire.

F : Fail

UN 38.3.4.2. : Thermal Test			
Clause	Requirement + Test	Result - Remarks	Verdict

Sample No.	Pre-condition	OCV before test (V)	Mass before test (g)	OCV after test (V)	Mass after test (g)	Mass loss (%)	Voltage remain (%)	Results
T1 to T5_1	Fresh	3.676	52.21	3.676	52.21	0	0	P
T1 to T5_2	Fresh	3.677	52.16	3.669	52.16	0	0.22	P
T1 to T5_3	Fresh	3.679	52.31	3.675	52.31	0	0.11	P
T1 to T5_4	Fresh	3.679	52.23	3.675	52.23	0	0.11	P
T1 to T5_5	Fresh	3.677	51.9	3.682	51.9	0	0.14	P
T1 to T5_6	Fresh	3.68	52.18	3.68	52.18	0	0	P
T1 to T5_7	Fresh	3.676	51.93	3.666	51.93	0	0.27	P
T1 to T5_8	Fresh	3.677	51.99	3.67	51.99	0	0.19	P
T1 to T5_9	Fresh	3.677	52.18	3.674	52.18	0	0.08	P
T1 to T5_10	Fresh	3.678	51.85	3.682	51.85	0	0.11	P
T1 to T5_11	Full Dis.	3.67	50.42	3.703	50.42	0	0.9	P
T1 to T5_12	Full Dis.	3.664	50.08	3.703	50.08	0	1.06	P
T1 to T5_13	Full Dis.	3.664	50.4	3.702	50.4	0	1.04	P
T1 to T5_14	Full Dis.	3.66	50.11	3.703	50.11	0	1.17	P
T1 to T5_15	Full Dis.	3.66	49.85	3.704	49.85	0	1.2	P
T1 to T5_16	Full Dis.	3.663	49.53	3.704	49.53	0	1.12	P
T1 to T5_17	Full Dis.	3.668	50.17	3.702	50.17	0	0.93	P
T1 to T5_18	Full Dis.	3.665	50.41	3.701	50.41	0	0.98	P
T1 to T5_19	Full Dis.	3.664	50.32	3.703	50.32	0	1.06	P
T1 to T5_20	Full Dis.	3.671	50.92	3.702	50.92	0	0.84	P

☐ Supplementary information:

Precondition:

Full Dis. : Fully discharged state.

Fresh : Undischarged state.

Results:

P : No leakage, no venting, no short-circuit (voltage not remain 90%), no rupture, no disassembly(explosion), and no fire.

F : Fail

UN 38.3.4.3. : Vibration Test			
Clause	Requirement + Test	Result - Remarks	Verdict

Sample No.	Pre-condition	OCV before test (V)	Mass before test (g)	OCV after test (V)	Mass after test (g)	Mass loss (%)	Voltage remain (%)	Results
T1 to T5_1	Fresh	3.676	52.21	3.674	52.21	0	0.05	P
T1 to T5_2	Fresh	3.669	52.16	3.674	52.16	0	0.14	P
T1 to T5_3	Fresh	3.675	52.31	3.676	52.31	0	0.03	P
T1 to T5_4	Fresh	3.675	52.23	3.675	52.23	0	0	P
T1 to T5_5	Fresh	3.682	51.9	3.678	51.9	0	0.11	P
T1 to T5_6	Fresh	3.68	52.18	3.677	52.18	0	0.08	P
T1 to T5_7	Fresh	3.666	51.93	3.673	51.93	0	0.19	P
T1 to T5_8	Fresh	3.67	51.99	3.674	51.99	0	0.11	P
T1 to T5_9	Fresh	3.674	52.18	3.677	52.18	0	0.08	P
T1 to T5_10	Fresh	3.682	51.85	3.678	51.85	0	0.11	P
T1 to T5_11	Full Dis.	3.703	50.42	3.704	50.42	0	0.03	P
T1 to T5_12	Full Dis.	3.703	50.08	3.705	50.08	0	0.05	P
T1 to T5_13	Full Dis.	3.702	50.4	3.705	50.4	0	0.08	P
T1 to T5_14	Full Dis.	3.703	50.11	3.704	50.11	0	0.03	P
T1 to T5_15	Full Dis.	3.704	49.85	3.706	49.85	0	0.05	P
T1 to T5_16	Full Dis.	3.704	49.53	3.705	49.53	0	0.03	P
T1 to T5_17	Full Dis.	3.702	50.17	3.704	50.17	0	0.05	P
T1 to T5_18	Full Dis.	3.701	50.41	3.703	50.41	0	0.05	P
T1 to T5_19	Full Dis.	3.703	50.32	3.705	50.32	0	0.05	P
T1 to T5_20	Full Dis.	3.702	50.92	3.702	50.92	0	0	P

☐ Supplementary information:

Precondition:

Full Dis. : Fully discharged state.

Fresh : Undischarged state.

Results:

P : No leakage, no venting, no short-circuit (voltage not remain 90%), no rupture, no disassembly(explosion), and no fire.

F : Fail

UN 38.3.4.4. : Shock Test			
Clause	Requirement + Test	Result - Remarks	Verdict

Sample No.	Pre-condition	OCV before test (V)	Mass before test (g)	OCV after test (V)	Mass after test (g)	Mass loss (%)	Voltage remain (%)	Results
T1 to T5_1	Fresh	3.674	52.21	3.675	52.21	0	0.03	P
T1 to T5_2	Fresh	3.674	52.16	3.673	52.16	0	0.03	P
T1 to T5_3	Fresh	3.676	52.31	3.676	52.31	0	0	P
T1 to T5_4	Fresh	3.675	52.23	3.674	52.23	0	0.03	P
T1 to T5_5	Fresh	3.678	51.9	3.678	51.9	0	0	P
T1 to T5_6	Fresh	3.677	52.18	3.676	52.18	0	0.03	P
T1 to T5_7	Fresh	3.673	51.93	3.674	51.93	0	0.03	P
T1 to T5_8	Fresh	3.674	51.99	3.673	51.99	0	0.03	P
T1 to T5_9	Fresh	3.677	52.18	3.676	52.18	0	0.03	P
T1 to T5_10	Fresh	3.678	51.85	3.678	51.85	0	0	P
T1 to T5_11	Full Dis.	3.704	50.42	3.676	50.42	0	0.76	P
T1 to T5_12	Full Dis.	3.705	50.08	3.678	50.08	0	0.73	P
T1 to T5_13	Full Dis.	3.705	50.4	3.683	50.4	0	0.59	P
T1 to T5_14	Full Dis.	3.704	50.11	3.675	50.11	0	0.78	P
T1 to T5_15	Full Dis.	3.706	49.85	3.703	49.85	0	0.08	P
T1 to T5_16	Full Dis.	3.705	49.53	3.679	49.53	0	0.7	P
T1 to T5_17	Full Dis.	3.704	50.17	3.679	50.17	0	0.67	P
T1 to T5_18	Full Dis.	3.703	50.41	3.679	50.41	0	0.65	P
T1 to T5_19	Full Dis.	3.705	50.32	3.673	50.32	0	0.86	P
T1 to T5_20	Full Dis.	3.702	50.92	3.677	50.92	0	0.68	P

☐ Supplementary information:

Precondition:

Full Dis. : Fully discharged state.

Fresh : Undischarged state.

Results:

P : No leakage, no venting, no short-circuit (voltage not remain 90%), no rupture, no disassembly(explosion), and no fire.

F : Fail

UN 38.3.4.5. : External short-circuit Test			
Clause	Requirement + Test	Result - Remarks	Verdict

Sample No.	Pre-condition	OCV before test (V)	Mass before test (g)	OCV after test (V)	Mass after test (g)	Mass loss (%)	Max. case Temp. (℃)	Results
T1 to T5_1	Fresh	3.671	52.21	0.001	52.21	0	60.676	P
T1 to T5_2	Fresh	3.673	52.16	0.004	52.16	0	57.506	P
T1 to T5_3	Fresh	3.673	52.31	-0.001	52.31	0	66.409	P
T1 to T5_4	Fresh	3.673	52.23	-0.001	52.23	0	60.605	P
T1 to T5_5	Fresh	3.675	51.9	0.001	51.9	0	57.262	P
T1 to T5_6	Fresh	3.672	52.18	0.001	52.18	0	63.776	P
T1 to T5_7	Fresh	3.678	51.93	0.01	51.93	0	58.434	P
T1 to T5_8	Fresh	3.678	51.99	0.003	51.99	0	60.068	P
T1 to T5_9	Fresh	3.667	52.18	-0.001	52.18	0	60.373	P
T1 to T5_10	Fresh	3.672	51.85	0.01	51.85	0	58.926	P
T1 to T5_11	Full Dis.	3.676	50.42	3.703	50.42	0	69.497	P
T1 to T5_12	Full Dis.	3.678	50.08	3.711	50.08	0	65.172	P
T1 to T5_13	Full Dis.	3.683	50.4	3.691	50.4	0	63.763	P
T1 to T5_14	Full Dis.	3.675	50.11	3.686	50.11	0	63.335	P
T1 to T5_15	Full Dis.	3.703	49.85	3.707	49.85	0	73.713	P
T1 to T5_16	Full Dis.	3.679	49.53	3.68	49.53	0	66.581	P
T1 to T5_17	Full Dis.	3.679	50.17	3.681	50.17	0	88.778	P
T1 to T5_18	Full Dis.	3.679	50.41	3.682	50.41	0	64.191	P
T1 to T5_19	Full Dis.	3.673	50.32	3.675	50.32	0	57	P
T1 to T5_20	Full Dis.	3.677	50.92	3.68	50.92	0	65.885	P

☐ Supplementary information:

Precondition:

Full Dis. : Fully discharged state.

Fresh : Undischarged state(with Fuse).

Results:

P : No leakage, no venting, no short-circuit (voltage not remain 90%), no rupture, no disassembly(explosion), and no fire.

F : Fail

UN 38.3.4*.6a. : Impact Test			
Clause	Requirement + Test	Result - Remarks	Verdict

Sample No.	Pre-condition	OCV before test (V)	Mass before test (g)	Max. case Temp. (℃)	Results
T6a_1	Fresh	3.674	52.16	19.8	P
T6a_2	Fresh	3.671	52.23	21.9	P
T6a_3	Fresh	3.676	51.93	19.8	P
T6a_4	Fresh	3.67	52.18	21.3	P
T6a_5	Fresh	3.673	51.85	22.5	P
T6a_6	Full Dis.	3.646	51.88	16.2	P
T6a_7	Full Dis.	3.633	52.19	42.3	P
T6a_8	Full Dis.	3.669	51.65	31.2	P
T6a_9	Full Dis.	3.664	51.97	23.2	P
T6a_10	Full Dis.	3.665	52.12	19.1	P

☐ Supplementary information:

Precondition:

Full Dis. : Fully discharged state(with Fuse).

Fresh : Undischarged state(with Fuse).

Results:

P : No leakage, no venting, no short-circuit (voltage not remain 90%), no rupture, no disassembly(explosion), and no fire.

F : Fail

UN 38.3.4.8. : Forced discharge Test			
Clause	Requirement + Test	Result - Remarks	Verdict

Sample No.	Pre-condition	OCV before test (V)	Mass before test (g)	OCV after test (V)	Reverse charging Current (A)	Max. case Temp. (℃)	Results
T8_1	Full Dis.	3.666	52.31	3.621	0.9	37.1	P
T8_2	Full Dis.	3.665	52.18	0.001		34.9	P
T8_3	Full Dis.	3.669	52.18	0		31.6	P
T8_4	Full Dis.	3.655	51.65	3.365		34.8	P
T8_5	Full Dis.	3.663	52.21	0		39.1	P
T8_6	Full Dis.	3.663	52.22	3.647		34.1	P
T8_7	Full Dis.	3.66	51.88	0		33.6	P
T8_8	Full Dis.	3.663	52.12	0		33.4	P
T8_9	Full Dis.	3.661	51.93	0		38.1	P
T8_10	Full Dis.	3.666	52.19	0		34.2	P

☐ Supplementary information:

Precondition:

Full Dis. : Fully discharged state.

Fresh : Undischarged state(with Fuse).

Results:

P : No leakage, no venting, no short-circuit (voltage not remain 90%), no rupture, no disassembly(explosion), and no fire.

F : Fail

4. Documents

4.1. Specifications

Lithium Primary Battery (Li-$SOCl_2$)

CLH-14

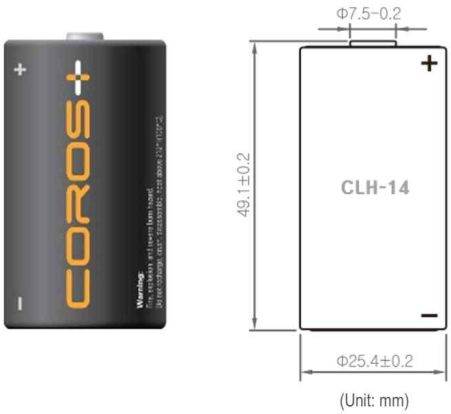
3.6V, C Spiral

COROS+

Specifications

Standard	ER26500
Nominal Voltage	3.6V
Nominal Capacity (@~15mA,to 2.0V)	6.0Ah
Max. Cont. Current	1000mA
Max. Pulse Current	2000mA
Operating Temp. range	-55~+85°C
Lithium Contents	~2.0g
Weight	52g
UL Filing No.	MH62104

Dimension



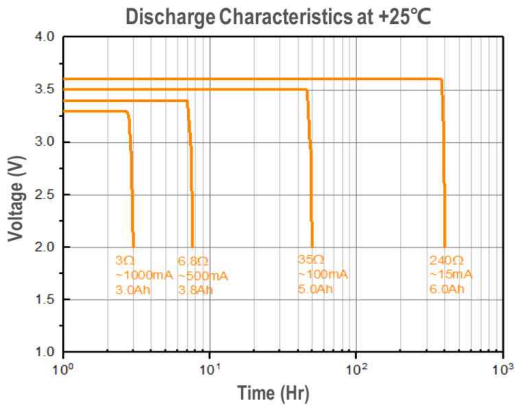
(Unit: mm)

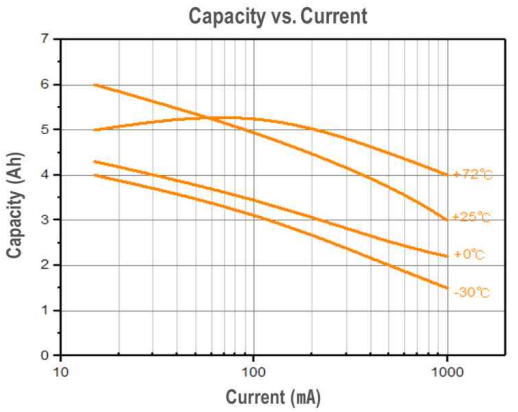
Available Terminals & Connectors

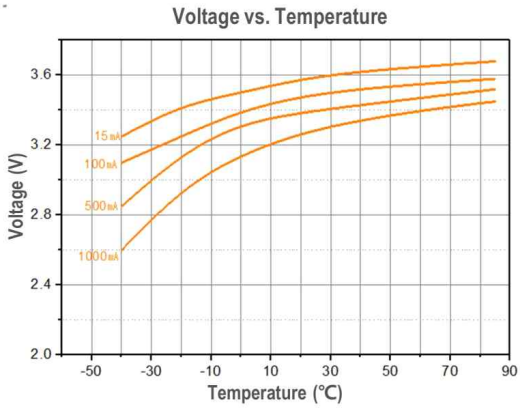
T1, AX, Wire, C&W (custom type)

WARNING

Fire, explosion, and severe burn hazards.
Do not disassemble
Do not heat above 100°C
Do not recharge, short circuit, crush, incinerate, or expose contents to water







(Typical values stored at 25°C for one year)

COROS BATTERY CO., LTD. www.corosbattery.com info@corosbattery.com

V-19A

Any values in this data sheet are only for information purpose and not the warranty of future performance and they are subjected to change without notice.