



TECHNICAL SPECIFICATION

Lithium Manganese Dioxide Battery

Model: CF502440

Approved	Checked	Draft
Liu Peng	Zhu Zhigang	Chen Lin

Customer signature
<p>Company name:</p> <p>Approved by:</p> <p>Signature date:</p>

Revision Record

Version	Reviser	Revise page	Established Date	Revise reason
A	Chen Lin	All	2023.1.31	First Edition

1. Scope

The document applies to CF502440 (Li/MnO₂) battery supplied by EVE Energy Co., Ltd. Specify quality, test method, performance, quality assurance and matters need attention etc..

2. Nominal specification

NO.	Item	Specification
2-1	Nominal Voltage	3.0V
2-2	Nominal Capacity	1200mAh (discharge current 1mA, cut-off voltage 1.8V at 23±2℃)
2-3	Max Discharge Current	Max.300mA
2-4	Pulse Capability	Up to 500 mA, Varies according to pulse characteristics, Temperature , cell history and application. Consult EVE.
2-5	Dimension	See attached drawing
2-6	Weight	About 9.0g
2-7	Operating Temperature	Operating: -20~70℃ (Note: Contact EVE in case continuous high-temperature over +40℃ or low-temperature down to 0℃ usage conditions.)
2-8	Storage Condition	Temperature: 5℃~35℃ Humidity: Less than 70%RH
2-9	Appearance	Free from flaw, stain, deformation, leakage and other defects.

3. Battery characteristics

NO.	Item	Test method	Test temperature	Initial value
3-1	Open circuit voltage	Voltage between terminal	23±2℃	3.0V~3.3V
3-2	Load voltage	30Ω load for 1s	23±2℃	≥2.90V
3-3	Temperature capacity test	1mA to 1.8V at different temperature		
		Discharge temperature		
		- 20℃	0℃	23℃
		50%	90%	100%

4. Test

4.1 Test condition

The test normal condition is as follow (unless otherwise specified)

Temperature: $23\pm 2^{\circ}\text{C}$, Relative Humidity: $65\pm 10\%$, Pressure: 1.0 atm.

4.2 Test Instrument

Dimension measurement: Caliper with accuracy of $\pm 0.02\text{mm}$, or gauge with the same accuracy.

4.2.1 Voltmeter: The tolerance shall be $\pm 0.01\text{V}$ and the input resistance rating shall be $10\text{M}\Omega$ or more.

4.2.2 Exactitude resistance: accuracy of $\pm 0.5\%$.

4.2.3 Resistance meter: accuracy of $\pm 0.5\%$.

4.2.4 Constant temperature oven: accuracy of $\pm 2^{\circ}\text{C}$.

4.2.5 Electronic scale: tolerance shall be $\pm 0.01\text{g}$.

4.3 Initial test

Batteries should be tested in the first 1 month after delivery

4.3.1 Outside dimensions

The gauge as specified in 4.2 is used. The result should meet the requirement of 2-5.

4.3.2 Appearance

Deformation or tarnish shall be visually checked. The result meet the requirement of 2-9.

4.3.3 Weight

The gauge as specified in 4.2 is used. The result should meet the requirement of 2-6.

4.3.4 Open circuit voltage

Batteries should be stored for 12 hours at the normal conditions. Then at the same circumstance use voltmeter, specified in 4.2 to measure voltage between "+" and "-". Results should meet the requirement of 3-1.

4.3.5 Load voltage

Batteries should be stored for 12 hours at the normal conditions. Then at the same circumstance, parallel connect voltmeter and 30Ω resistance specified in 4.2 to measure voltage between "+" and "-". Result should meet the requirement of 3-2.

4.3.6 Vibration Test

This test shall be carried out by the following condition according to UN Manual of test and Criteria, Part III, sub-section 38.3.4.5. Amplitude: 0.8mm; Frequency: 7 Hz to 200 Hz; Duration: 15 minutes; Directions: X Y Z; Duration: 15 minutes, 12 times (each direction).

4.3.7 Drop test

The batteries are to be dropped onto concrete ground from a height of 1.2m for three times.

The cells pass the test without leakage, explosion or fire.

4.4 Safety test

4.4.1 Puncture test

The batteries are to be penetrated vertically through the center of the cell by a nail and kept for over 1h. The diameter of the nail is 2.5~3.5mm.

4.4.2 Flexibility test

The batteries are to be bended horizontally or vertically. The bending angle is larger than 90° .

4.4.3 UN38.3

UN38.3 test items include: height simulation, temperature test, vibration test, concussion, outer short circuit, impact test, and forced discharge. The batteries meet the UN38.3 test standard.

4.4.4 UL1642

UL1642 test items include: short circuit(RT/55°C), abnormal charge, forced discharge, crush, impact, shock, vibration, heating, temperature cycling, and low pressure. The batteries meet the UL1642 test standard.

5. Mark

5.1 Battery type : CF502440

5.2 Battery brand name: EVE

5.3 Mark: "MM","YY" stand for "month" and "year"

5.4 Polarity: "+" stand for cathode, "-" stand for anode

6. Incoming inspection

Before shipping, EVE will 100% check open circuit voltage of the battery (OCV).

Also EVE will sampling tests the battery capacity and the load voltage, visual appearance and size.

As for the customer's incoming inspection, EVE recommended sampling according to GB2828.1-2003, GB2829-2002 standard.

Table 1 Acceptability quality level

No	Item	Technical request	Check level	AQL
1	Dimension	2-6	S-2	0.65
2	Appearance	2-8	II	1.0
3	Open circuit voltage	3-1	II	0.4

Table 2 Sampling amount

Lot size	Sampling amount
≤ 3200	32
3200~10 000	50
$> 10\ 000$	80

7. Package

The batteries are packed as the agreement of the customer and supplier. The box should have the eligible identifiers and QC PASS mark.

8. Transportation

The battery out of factory is full of electric power, so avoid fierce shake, strike and squeeze. Avoid the direct sunshine and raining.

9. Warnings and Cautions

Lithium batteries contain volatile materials such as lithium, organic solvents and other chemical ingredients. Incorrect handling of lithium batteries may result in heat generation, fire or explosion, with the risk of personal injury or damage. To prevent accidents when handling batteries, be sure to follow the following precautions.

- Do not short circuit, charge or make the anode and the cathode reversed.
- Do not force-discharge, squeeze, puncture or burn the battery
- Do not disassemble the battery
- The battery should be taken off from instrument when it is consumed to cut-off voltage, and dispose according to local laws, or hand it to professional recycle institution.
- Do not mix different types of batteries.
- Do not expose the battery in the environment of over 75°C.

- Do not solder directly onto battery, please use wire or nickel sheet by spot welding.
- Store the battery by original pack to avoid any possibility of external short circuit.
- Don't store the battery in ESD bag and foam.
- Don't store battery in electric metal surface.
- Do not stack or jumble batteries.
- Don't pack battery connected with any kinds of lead random in paper box or pack belt.
- Batteries shall be far away from children, and take measures to prevent the swallow as much as possible

10. Modification of this specification

Modification must be carried out after the prior mutual agreement. All accident or issues caused by any events that are neither defined nor described in this specification, mutual discussion shall take place for the resolution.

11. Important notes

- 1) The batteries are warranted to conform to the description contained in this specification for a period of twelve [12] months from the ex-factory date without use, any claim by customer (apparatus manufacturer or distributor) must be pointed out within such period. During that warranty period, if the batteries are proved to become defective under proper stored and handled, EVE will replace the batteries for free.
- 2) Customers are responsible to confirm and assure the matching and reliability of batteries under actual application.
- 3) EVE shall not warrant or be responsible in any case where customers fail to carry out proper handing, operating, installation, testing and maintaining batteries, or don't follow the instruction, cautions, warnings, notes provided in this specification and other EVE's reasonable instructions or advises.
- 4) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.

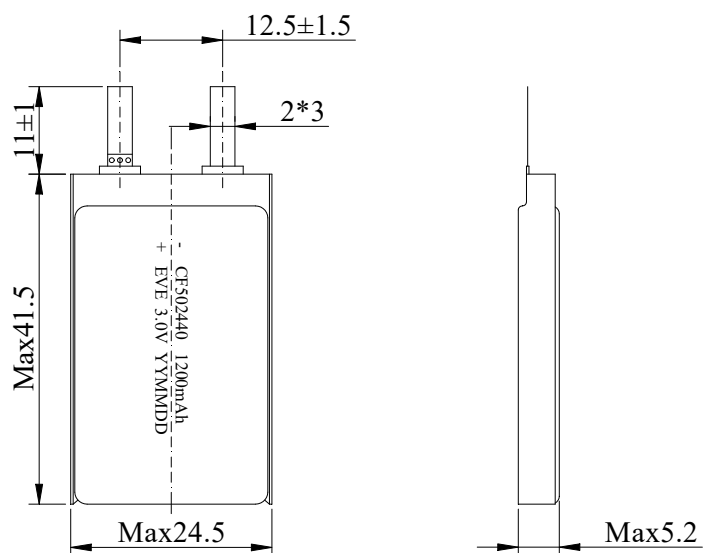
12. Remark of production duty

Customers must strictly operate according to specification and advises of EVE ENERGY CO., LTD.

Operation at temperature different from ambient may lead to reduced capacity and lower voltage

reading at the beginning of pulses. EVE will be exemption from liability if the batteries are improper used or abused and then cause fire, explosion, the human body or property damage.

13. Drawing



Dimensions are in mm