Product	LF324	Specification No.	JMRI-LF324-D06-01	Version	A

Customer's Requirement

Customers are requested to write out their requirement information and communicate with EVE Power Co., Ltd. in advance. If the customer has some special applications or operating conditions different from those described in this document, EVE Power Co., Ltd. can design and manufacture the product according to the customer's special requirements.

No.	Special Requirements	Standards
1		
2		
3		
4		
5		

Customer Code Sign Date

Content

Term Define

Product: Refers to the LF324 rechargeable lithium-ion cell with prismatic manufactured by EVE Power Co., Ltd. (hereinafter referred to as EVE) in this specification.

Customer: Refers to the buyer in the product sales contract signed with EVE.

Environment temperature: The ambient temperature where the cell is located.

Cell temperature: The temperature measured by temperature sensor installed at the center of cell surface. The selection of temperature sensor and measuring line shall be jointly agreed by EVE and the customer.

Fresh cell: Refers to cell within 28 days after production.

Charging Rate: The ratio of the charging current to the capacity which measured by the battery management system. For example, if the cell capacity is 324 Ah and the charging current is 162 A, the charging rate is 0.5C. If the cell capacity drops to 310 Ah and the charging current is 155 A, the charging rate is 0.5C.

State of charge: Under unloaded conditions, the ratio of the cell capacity state to the nominal capacity measured in ampere-hour or watt- hour. The abbreviation is expressed by SOC. For example, if the capacity at 324 Ah considered as 100% SOC, the capacity at 0 Ah, considered as 0% SOC.

State of health: The ratio of actual cell capacity to nominal capacity, the abbreviation is expressed by SOH. For example, if the cell capacity at 324 Ah considered as 100% SOH, the cell capacity decays to 259.2 Ah, considered as 80% SOH.

Cycle: The cell shall be charged and discharged once according to the specified charging and discharging standards as a cycle. The cycle includes short-term normal charging or a combination of regenerative charging and discharging processes. In the charging process, sometimes there is only normal charging and no regenerative charging. The discharge can be formed by combining some partial discharges.

Standard charge: The charging mode described in 3.8 of this specification.

Standard discharge: The discharging mode described in 3.9 of this specification.

Open circuit voltage: The voltage of the cell measured when unloaded or circuit is disconnected. The abbreviation is expressed by OCV.

AC resistance: Apply 1kHz sine wave current between the positive and negative poles of the cell, and the internal resistance obtained, which abbreviated as ACR. The test method is as described in section 3.6 of this specification.

DC resistance: The ratio of the voltage changes to the corresponding current change under working conditions, and the abbreviation is DCR. The test method is as described in section 3.6 of this specification.

Module: The intermediate product between single cell and pack, which is formed by lithium-ion cells in series and parallel after installing cell monitors and management devices.

Pulse current: The currents that appear periodically are called pulse currents. The pulse currents appear either in the same direction or in alternating positive and negative directions.

Compression force: When the module is assembled, the cell can withstand the force perpendicular to the cell stacking direction.

Swelling force: In the process of use, the expansion force due to the change of the thickness of electrodes, gas production and other factors lead to the expansion of battery cell.

Units of measurement： Refer to following table

Table 1 Units of measurement

No.	Units	Abbreviation	Type of units
1	Volt	V	Voltage
2	Ampere	A	Current
3	Ampere-Hour	Ah	Capacity
4	Watt-Hour	Wh	Energy
5	Ohm	Ω	Resistance
6	Milliohm	mΩ	Resistance
7	Degree Celsius	℃	Temperature
8	Millimeter	mm	Length
9	Second	s	Time
10	Hertz	Hz	Frequency
11	Newton	N	Force
12	Kilogram-Force	kgf	Force

1 Fundamental Information

1.1Scope

This document describes in detail the product performance specification of the rechargeable LFP cylindrical cell produced by EVE Power Co., Ltd., as well as the product use conditions and risk warnings.

1.2 Cell Classification and Model

1.2.1 Cell Classification

1.2.2 Cell Model LF324 Prismatic Lithium-ion Cell

2 Cell Specification

2.1 Nominal Specification

Table 2 Nominal specifications and parameters

No.	Items	Specification	Notes
2.1.1	Nominal Capacity	⩾324.0 Ah	Fresh battery Follow the standard charging and discharging modes described in 3.8 and 3.9
2.1.2	Nominal Energy	⩾1043.28 Wh	
2.1.3	Nominal Voltage	3.22 V	0.5C discharge, 25℃ ± 2℃, 2.5 V ~ 3.65 V
2.1.4	End-off-charge Voltage	3.65 V	/
2.1.5	End-off-discharge Voltage	2.5 V (T > 0℃) 2.0 V (T ≤ 0℃)	/
2.1.6	Standard Charging Current	0%~80%SOC 1C 80%SOC-3.5V 0.8C 3.5V-3.6V 0.5C 3.6V-3.65V 0.1C	25℃ ± 2℃
2.1.7	Maximum Instantaneous Charging Current	2C	30 s, ≤ 80% SOC, 25℃ ± 2℃
2.1.8	Standard Discharging Current	162 A	25℃ ± 2℃，0.5C

2.1.9	Maximum Instantaneous Discharging Current		3C	30 s, ≥ 30% SOC, 25℃ ± 2℃
2.1.10	Initial IR		0.24mΩ ± 0.05mΩ	AC, 1 kHz, 19% ~ 23% SOC Fresh cell
2.1.11	Direct Current Resistance (DCR)		≤ 1.2 mΩ	25℃, 50% SOC, 1C, 10 s Fresh cell
2.1.12	Weight		5417 g ± 163 g	/
2.1.13	Dimension (With Insulation Film)	1 (H1) Terminal Height	218.2 mm ± 0.5 mm	With Terminal
		2 (H2) Can-top Height	215.5 mm ± 0.5 mm	Without Terminal
		(L) Length	200.7 mm ± 0.5 mm	Bottom Triangular area
		(T) Thickness	56.9 mm ± 0.5 mm	(300 kgf ± 20 kgf compression force, Delivery SOC)
		(D) Center Distance between Poles	150.0 mm ± 0.3 mm	/
2.1.14	Operation Temperature	Charge Temperature	-10℃~65℃	
		Discharge Temperature	-35℃~65℃	
2.1.15	Storage Temperature	3 months	0℃ ~ 35℃	Delivery SOC
		1 month	-20℃ ~ 45℃	
2.1.16	Swelling force at EOL		≤ 40000 N	80% SOH

Note: Testing the cell using the fresh cell.

2.2 Electrical Performance Parameters

Table 3 Electrical performance parameters

No.	Items	Specifications	Testing Methods

Product	LF324	Specification No.	JMRI-LF324-D06-01	Version	A

No.	Item	Items / Rate	Discharging Capacity	Capacity Retention	/
2.2.1	Rate Discharge Performance	1C	C_0	100%	3.10
		0.5C	C_1	$C_1/C_0 \geq 98\%$	3.11
2.2.2	High/Low Temperature Discharge Performance	Items / Temp.	Discharging Capacity	Capacity Retention	3.12
		-20℃	C_2	$C_2/C_0 \geq 75\%$	
		0℃	C_3	$C_3/C_0 \geq 85\%$	
		25℃	C_0	100%	
		45℃	C_4	$C_4/C_0 \geq 97\%$	
		55℃	C_5	$C_5/C_0 \geq 97\%$	
2.2.3	(100%SOC) The Capacity Retention and Recovery	Items / Temp.	Capacity Retention	Capacity Recovery	3.13
		25℃ & 28days	≥ 96%	≥ 97%	
		45℃ & 28days	≥ 93%	≥ 95%	
		55℃ & 7days	≥ 95%	≥ 96%	
2.2.4	(50%SOC) Storage	Items / Temp.	Capacity Recovery		3.14
		25℃ & 28days	≥ 98%		
		45℃ & 28days	≥ 97%		
2.2.5	Cycle Life	25℃ Cycle	4000 cycles, 80% SOH, 25℃		3.15
		45℃ Cycle	2000 cycles, 80% SOH, 45℃		

Note: Testing the cell using the fresh cell.

2.3 Safety Performance Parameters

Table 4 Safety performance parameters

No.	Items	Specifications	Testing Methods

2.3.1	Over-discharge	No fire, No explosion	3.16.1
2.3.2	Over-charge	No fire, No explosion	3.16.2
2.3.3	External Short-circuit	No fire, No explosion	3.16.3
2.3.4	Heating	No fire, No explosion	3.16.4
2.3.5	Temperature Cycling	No fire, No explosion	3.16.5
2.3.6	Crush Test	No fire, No explosion	3.16.6

Remark： Customer need to confirm the specific test method and precautions with EVE before performing electrical performance, safety performance tests and other test standards beyond this Sample Specifications.

2.4 Cell Drawing

See Appendix1.

2.5 Appearance

The cell shall not have any defects that may affect their commercial values, including obvious scratches, cracks, rust stains, discoloration, or electrolyte leakage.

3 Testing Conditions

3.1 Environmental Conditions

Unless otherwise specified, the test should be carried out in an environmental temperature of 25°C ± 2°C, relative humidity of 10% ~ 90%, and atmospheric pressure of 86 kPa to 106 kPa. The room temperature mentioned in this specification refers to 25℃ ± 2℃.

The entire process of short-term electrical performance testing needs to be conducted under the conditions of the testing fixture (refer to Appendix A of GB31486-2024).

3.2 Measuring Instrument

The accuracy of measuring device should meet the following requirements:

A.Voltage measuring device: ± 0.05 %FS

B.Current measuring device: ± 0.05 %FS

C.Temperature measuring device: ± 1℃

D.Dimension measuring device: ± 0.01 mm

E.Weight measuring device: ± 0.1 g

Note: During the testing process, voltage, current, ambient temperature, and cell temperature must be recorded. It is recommended to collect the cell temperature at the terminal and the center of large surface (or side).

3.3 Test Clamp Preparation and Installation

3.3.1 Ordinary Steel Clamp

The single cell shall be clamped with steel splints (thickness: 12~20 mm). The splints need to cover the large surfaces of the cell and be fixed with 6 M8 bolts. All sides of the splints need to be covered with insulating film. Clamp as shown below:

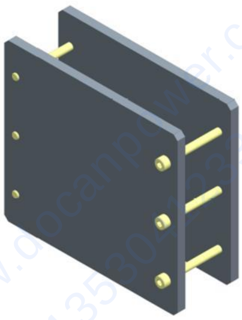


Fig. 1 Diagram of cell clamp

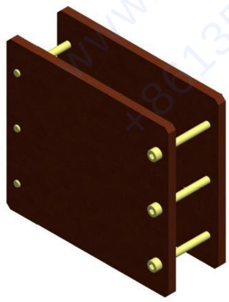


Fig. 2 Diagram of the clamp covered with insulation film

Place the cell (15% ~ 40%SOC) which is covered with blue film (material: PET, thickness: 0.1mm) and top film (material: PC, thickness: 0.3 mm) in the middle of the splint, fix the steel fixture with 6 M8 bolts to ensure that the initial preload of the cell on the fixture is 300 kgf ± 20 kgf. Then use a micrometer to measure the thickness of the cell (at upper, middle and lower) with splints, and the thickness tolerance shall be controlled within 0.3 mm.

Fig. 3 Diagram of cell filming

Fig. 4 Diagram of cell with clamp

3.3.2 Cycle Testing Fixture

After preparing the battery (15%~40% SOC) wrapped with a blue film (material: PET, thickness: 0.1 mm) and a top patch (material: PC, thickness: 0.3 mm), attach a layer of cushioning material (e.g., XPP material, which buffers the expansion of the battery during charging and discharging; the XPP dimensions should be designed with reference to Example Table 5, covering the entire large surface of the cell as shown in Figure 5) to each of the two large surfaces of the battery. Place the battery in the center of the expansion force fixture, adjust the preload device of the fixture to achieve a gap of 3% of the battery thickness, and then secure the upper clamping plate. Use a micrometer to measure the thickness of the battery with the clamping plate (top, middle, and bottom), ensuring the thickness variation is controlled to ≤0.3 mm. Refer to Appendix 2 for the illustration.

Table 5 XPP size parameters

XPP specifications		
Battery type	Cushioning material	XPP dimensions before compression (L×W×T) /mm
LF324	XPP	199*215*1

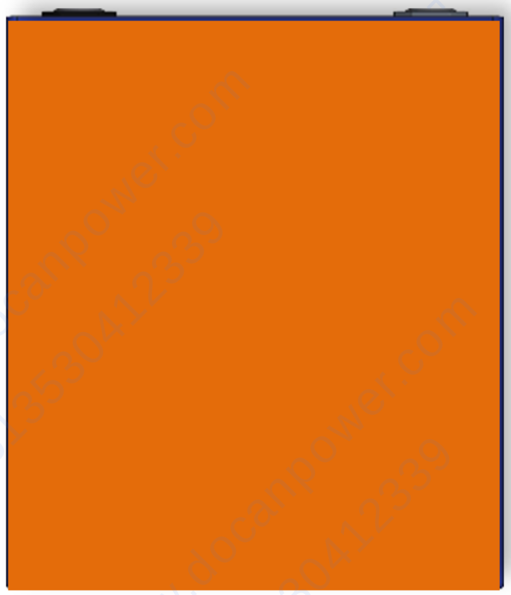


Fig. 5 XPP Pad Mounting Illustration

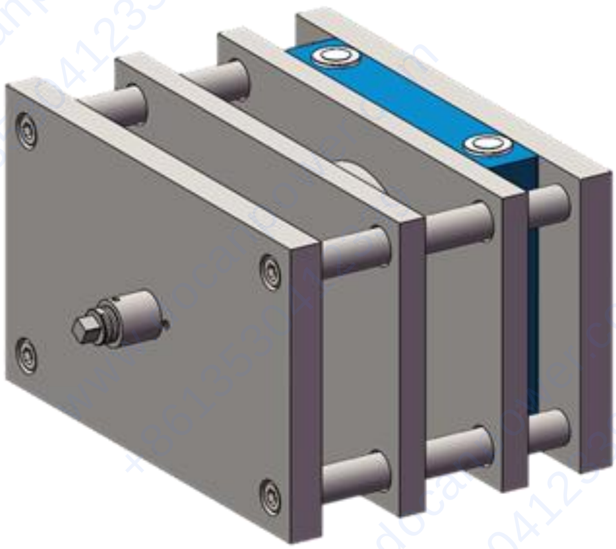


Fig. 6 Battery Cycling Fixture Schematic

3.4 Dimensions

Test instrument: Automatic wrapping machine.

Test method: Use the wrapping machine to measure the length, width and height of the cell. And apply a 300 kgf ± 20 kgf force on it.

The thickness of the cell will increase as the SOC increases as well as with the using time. The thickness here indicates the thickness of the cell at the time of delivery.

3.5 Weight

Test instrument: electronic scale.

Test method: measure the weight of the cell by electronic scale.

3.6 Internal Resistance

a. ACR: test the cell at delivery SOC with 1kHz sine wave current at room temperature.

b. DCR: Capacity calibration is carried out according to 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25℃ ± 2℃. Rest for 30 min, and discharge with constant current of 0.5C for 60 min afterwards (adjust the SOC to 50%). Then rest for 1 h, and record the voltage V_1 at the end of the period. Put a 10 s discharge pulse current of 1C and record the voltage V_2 at the end of the pulse, and calculate the DCR., DCR= $(V_1 - V_2) \times 1000 / 324.0$ (mΩ).

3.7 Pretreatment

Before the formal test, pretreat the cell to ensure it is activated and stable. The steps are as follows:

a. Charge the cell according to the standard 3.8 charging mode;

b. Discharge the cell according to the standard 3.9 discharging mode;

c. Repeat a~b no more than 5 times;

If the discharge capacity of the cell changes no more than 3% of the nominal capacity for two consecutive times, it is considered that the cell has completed the pretreatment, and the pretreatment cycle can be terminated.

3.8 Standard Charge

At ambient temperature of 25℃ ± 2℃, the cell is charged with the step of a~d, and rest the cell for 30 min.

a. With 1C constant current charging to 80%SOC;

b. 0.8C constant current charging to 3.5V;

c. 0.5C constant current charging to 3.6V;

d. 0.1C constant current charging to 3.65V.

3.9 Standard Discharge

Discharge the cell to 2.5 V with constant current of 0.5C at ambient temperature of 25℃ ± 2℃, and rest for 30 min.

3.10 1C Capacity Calibration

Charge the cell to 3.65 V with constant current of 1C at ambient temperature of 25℃ ± 2℃ (constant temperature without air convection). The battery is charged according to the 3.8 standard charging method. After that, discharge the cell to 2.5 V with constant current of 1C, lastly rest for 30 min. Repeat the above steps 5 times, and the average discharge capacity of the last 3 times is the 1C discharge capacity, which is recorded as C_0.

3.11Rate Discharge Performance

Capacity calibration is carried out according to 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25℃ ± 2℃, and discharge it to 2.5 V with constant current of 0.5C. Discharge capacity is recorded as C_1, and $C_1 / C_0 \times 100\%$ is the capacity retention rate at 0.5C.

3.12 High/Low Temperature Discharge Performance

3.12.1 -20℃ Capacity Retention Rate

Capacity calibration is carried out according to 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25℃ ± 2℃. After that, rest the cell at -20℃ ± 2℃ for 24 h, and discharge it to 2.0 V with constant current of 1C under the environment of -20℃ ± 2℃. Discharge capacity is recorded as C_2, and $C_2 / C_0 \times 100\%$ is the capacity retention rate at -20℃.

3.12.2 0℃ Capacity Retention Rate

Capacity calibration is carried out according to 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25℃ ± 2℃. After that, rest the cell at 0℃ ± 2℃ for 24 h, and discharge it to 2.0 V with constant current of 1C under the environment of 0℃ ± 2℃. Discharge capacity is recorded as C_3, and $C_3 / C_0 \times 100\%$ is the capacity retention rate at 0℃.

3.12.3 45℃ Capacity Retention Rate

Capacity calibration is carried out according to 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25℃ ± 2℃. After that, rest the cell at 45℃ ± 2℃ for 5 h, and discharge it to 2.5 V with constant current of 1C under the environment of 45℃ ± 2℃. Discharge capacity is recorded as C_4, and $C_4 / C_0 \times 100\%$ is the capacity retention rate at 45℃.

3.12.4 55℃ Capacity Retention Rate

Capacity calibration is carried out according to 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C. After that, rest the cell at 55°C ± 2°C for 5 h, and discharge it to 2.5 V with constant current of 1C under the environment of 55°C ± 2°C. Discharge capacity is recorded as C_5, and $C_5 / C_0 \times$ 100% is the capacity retention rate at 55°C.

3.13 The Capacity Retention and Recovery

3.13.1 25°C Capacity Retention and Recovery

Capacity calibration is carried out according 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and rest for 28 days afterwards at ambient temperature of 25°C ± 2°C. Discharge the cell to 2.5 V with constant current of 1C at ambient temperature of 25°C ± 2°C (record the discharge capacity as C_6), and rest for 30 min. Then The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and discharge to 2.5 V with constant current of 1C (record the discharge capacity C_7). Capacity retention rate=$C_6 / C_0 \times$ 100 %, capacity recovery rate=$C_7 / C_0 \times$ 100 %.

3.13.2 45°C Capacity Retention and Recovery

Capacity calibration is carried out according 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and rest for 28 days afterwards at ambient temperature of 45°C ± 2°C. Rest for 5h at ambient temperature of 25°C ± 2°C, and then discharge the cell to 2.5 V with constant current of 1C (record the discharge capacity C_8). After rest for 30 min, the battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and discharge to 2.5 V with constant current of 1C (record the discharge capacity C_9). Capacity retention rate= $C_8 / C_0 \times$ 100 %, capacity recovery rate= $C_9 / C_0 \times$ 100 %.

3.13.3 55°C Capacity Retention and Recovery

Capacity calibration is carried out according 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and rest for 7 days at ambient temperature of 55°C ± 2°C. Rest for 5h at ambient temperature of 25°C ± 2°C, and discharge the cell to 2.5 V with constant current of 1C (record the discharge capacity C_{10}). After rest for 30 min, the battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and then discharge to 2.5 V with constant current of 1C (record the discharge capacity C_{11}). Capacity retention rate=$C_{10} / C_0 \times$ 100 %, capacity recovery rate=$C_{11} / C_0 \times$ 100 %.

3.14 Storage

3.14.1 25°C Storage

Capacity calibration is carried out according 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C. Then discharge cell to 2.5 V with constant current of 1C. Rest for 28 days at ambient temperature of 25°C ± 2°C. Discharge the cell to 2.5 V with constant current of 1C at ambient temperature of 25°C ± 2°C, and rest for 30 min. Then The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and discharge to 2.5V with constant current of 1C (record the discharge capacity C_{12}). Capacity recovery rate=C_{12} / C_0 × 100%.

3.14.2 45°C Storage

Capacity calibration is carried out according 3.10. The battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C. Then discharge cell to 2.5 V with constant current of 1C. Rest for 28 days at ambient temperature of 45°C ± 2°C. Rest for 5h at ambient temperature of 25°C ± 2°C, and discharge the cell to 2.5 V with constant current of 1C. Rest for 30 min, the battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and then discharge to 2.5 V with constant current of 1C (record the discharge capacity C_{13}). Capacity recovery rate= C_{13} / C_0 × 100%.

3.15 Cycle Life

Before the test, prepare and install the clamp according to 3.3.2.

Initial capacity test before cycling: test the cell capacity according to (3.10). and record the initial capacity as C_0.

3.15.1 Steps of 25°C Staged Charging Cycle:

a. Ambient temperature at 25
b. With 1C constant current charging capacity as 80% C_0;
c. 0.8C constant current charging to 3.5 V;
d. 0.5C constant current charging to 3.6 V;
e. 0.1C constant current charging to 3.65 V;
f. Rest for 30 min in an open circuit state, discharge to 2.5 V with constant current of 1C, and rest for 30 min;
g. Repeat steps from b to f. When the cycle capacity retention rate decreases by 5%, the current value of 1C is adjusted to 1C × (1 – 5% × n), n=1, 2, 3, 4, ...; ensure the charging time remains the same every 5% decay, and the specific steps are shown in the corresponding charging and discharging ammeter of the staged charging cycle;
h. 4000 cycles according to steps b ~ g.

Capacity test after cycle: discharge the cell to 2.5 V with constant current of 0.5C at ambient temperature of 25°C ± 2°C. Rest for 30 min, the battery is charged according to the 3.8 standard charging method at ambient temperature of 25°C ± 2°C, and discharging to 2.5 V with constant current of 0.5C, and record the discharge capacity C_{14}. The capacity retention rate = C_{14} / 324 × 100%.

3.15.2 Steps of 45 °C Staged Charging Cycle:

a. Ambient temperature at 45℃ ± 2℃;

b. With 1C constant current charging capacity as 80% C_0;

c. 0.8C constant current charging to 3.5 V;

d. 0.5C constant current charging to 3.6 V;

e. 0.1C constant current charging to 3.65 V;

f. Rest for 30 min in an open circuit state, discharge to 2.5 V with constant current of 1C, and rest for 30 min;

g. Repeat steps from b to f. When the cycle capacity retention rate decreases by 5%, the current value of 1C is adjusted to 1C × (1 – 5% × n), n=1, 2, 3, 4, ...; ensure the charging time remains the same every 5% decay, and the specific steps are shown in the corresponding charging and discharging ammeter of the staged charging cycle;

h. 4000 cycles according to steps b ~ g.

Capacity test after cycle: discharge the cell to 2.5 V with constant current of 0.5C at ambient temperature of 25℃ ± 2℃. Rest for 30 min, the battery is charged according to the 3.8 standard charging method at ambient temperature of 25℃ ± 2℃, then discharging to 2.5 V with constant current of 0.5C, and record the discharge capacity C_{15}. The capacity retention rate = C_{15} / 324 × 100%.

Corresponding Charging Current Table for Staged Charging Cycle:

Table 6 Corresponding charging current meter for stepped charging cycle

Items	Current/Capacity	Current capacity / calibratedcapacity × 100% (SOH)			
		> 95%	[95% ~ 90%)	[90% ~ 85%)	[85% ~ 80%)
Charging Current (A)	1C	324.0	307.8	291.6	275.4
	0.8C	259.2	246.2	233.3	220.3
	0.5C	162	153.9	145.8	137.7
	0.1C	32.4	30.7	29.1	27.5
Discharging Current (A)	1C	324	308	292	275
1C constant Current Charge to 80% C_0;		80% C_0	76% C_0	72% C_0	68% C_0

Notes: When the cycle capacity retention rate decreases by 5%, the charging current 1C / 0.8C / 0.5C / 0.1C current value is adjusted to 1C / 0.8C / 0.5C / 0.1C × (1 – 5% × n) at this time, n=0, 1, 2, 3, 4, …; set the current according to the charging and discharging ammeter corresponding to the stepped charging.

3.16 Safety Performance

3.16.1 Over-discharge

The battery is charged according to the 3.9 standard discharging method at ambient temperature of 22℃ ± 5℃. Discharge the cell with constant current of 1C for 30 min at 22℃ ± 5℃ of safety test. Observe for 1 h. (Refer to GB 38031-2025 electric vehicles traction cell safety requirements)

3.16.2 Over-charge

The battery is charged according to the 3.8 standard charging method at ambient temperature of 22℃ ± 5℃, then installing the test clamp according to 3.3.1. After charge the cell to 1.1 times of the termination voltage, or 115% SOC with constant current of not less than 1 / 3C at the safety test ambient temperature of 22℃ ± 5℃, stop charging. Observe for 1 h. (Refer to GB 38031-2025 electric vehicles traction cell safety requirements)

3.16.3 External Short-circuit

The battery is charged according to the 3.8 standard charging method at ambient temperature of 22℃ ± 5℃. The positive and negative terminals of the cell are short-circuited externally for 10 min under the safety test ambient temperature of 22℃ ± 5℃, and the resistance of the external circuit should be less than 5 mΩ. Observe for 1 h. (Refer to GB 38031-2025 electric vehicles traction cell safety requirements)

3.16.4 Heating (130℃)

The battery is charged according to the 3.8 standard charging method at ambient temperature of 22℃ ± 5℃. Put the cell into the temperature chamber, and the temperature chamber will rise from room temperature to 130℃ at a rate of 5 ℃/min, and keep this temperature for 30 min before stop heating. Observe for 1 h. (Refer to GB 38031-2025 electric vehicles traction cell safety requirements)

3.16.5 Temperature Cycling

The battery is charged according to the 3.8 standard charging method at ambient temperature of 25℃ ± 2℃. Put the cell into the temperature chamber, and adjust the temperature chamber according to the following table and figure, and cycle for 5 times. (Refer to GB 38031-2025 electric vehicles traction cell safety requirements)

Table 7 Temperature cycle corresponding parameter table

℃) Temperature	min) Time Increment	min) Time Accumulation	℃/min) Temperature Change Rate
25	0	0	0
-40	60	60	13/12
-40	90	150	0
25	60	210	13/12
85	90	300	2/3
85	110	410	0
25	70	480	6/7

3.16.6 Crush

The battery is charged according to the 3.8 standard charging method at ambient temperature of 22℃ ± 5℃. Test under the following conditions at a safety test environment temperature of 22℃ ± 5℃:

a) Crushing direction: apply pressure perpendicular to the direction of the cell plate, or the same direction that the cell is most susceptible to be crushed in the layout of the whole vehicle;

b) The form of the crushing plate: a semi-cylinder with a radius of 75 mm, the length (L) of the semi-cylinder is greater than the size of the cell being crushed (refer to the figure below);

c) Crushing speed: not more than 2 mm/s;

d) Crushing degree: stop crushing after the voltage reaches 0 V or the deformation reaches 15% or the crushing force reaches 100000 N or 1000 times the weight of the test object;

e) Maintain the current position for 10 minutes. Observe for 1 h. (Refer to GB 38031-2025 electric vehicles traction cell safety requirements)

4 Cell Application Instructions

4.1 Welding Parameters Recommendation

Table 8 Parameters Table

Items		Specifications	Notes
Welding Parameter of Al Busbar	Laser Welding Depth	≤ 2.0 mm	/
	Pressure Force on Poles	700 N	Max force in longitudinal direction, no deformation.
	Max Torque Force on Poles	6 N·m	Max torsion, non-loosen.
	Max Temperature Force on Poles	130℃	The maximum temperature that the pole bears before the plastic pad deforms.

4.2 Charge and Discharge Parameters

The following data is the reference performance data of LF324 Cell during BMS design. Actual use is subject to the using mode and conditions agreed by both parties.

4.2.1 Charging Mode

Table 9 Charging mode parameter table

Parameters	Product Specifications	Notes
Standard Charging Current	0%~80%SOC 1C 80%SOC-3.5V 0.8C 3.5V-3.6V 0.5C 3.6V-3.65V 0.1C	25℃ ± 2℃
Maximum Continuous Charging Current	1C	
Standard Charging Cut-off Voltage	Single cell ≤ 3.65 V	

Charging Mode	Refer to section 3.8	
Standard Charging Temperature	25℃ ± 2℃	
Absolute Charging Temperature (Cell Temperature)	-10℃ ~ 65℃	No matter what charging mode the cell is in, once the cell temperature exceeds the absolute charging temperature range, stop charging.
Absolute Charging Voltage	Max 3.65 V	No matter what charging mode the cell is in, once the cell voltage exceeds the absolute charging voltage, stop charging.

4.2.2 Other Charging Modes

4.2.2.1 Continuous Charging Modes

Table 10 Continuous charging modes / C-cell level (unit: C-Rate)

T/SOC	0%	5%	10%	20%	30%	40%	50%	60%	70%	80%	85%	90%	95%	99%	100%
-10℃	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-5℃	0.20	0.20	0.20	0.10	0.10	0.10	0.06	0.06	0.06	0.06	0.04	0.02	0.01	0.01	0.01
0℃	0.50	0.50	0.50	0.30	0.30	0.20	0.20	0.20	0.12	0.12	0.10	0.10	0.07	0.02	0.01
5℃	0.70	0.70	0.70	0.70	0.50	0.40	0.40	0.40	0.20	0.20	0.12	0.12	0.10	0.03	0.01
10℃	0.80	0.80	0.80	0.80	0.80	0.60	0.60	0.60	0.40	0.40	0.30	0.30	0.20	0.05	0.01
15℃	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.80	0.60	0.60	0.40	0.40	0.30	0.08	0.05
20℃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.80	0.80	0.60	0.40	0.09	0.05
25℃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.50	0.33	0.10
30℃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.50	0.33	0.10
35℃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.50	0.33	0.10
40℃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.50	0.33	0.10
45℃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.50	0.33	0.10
50℃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.50	0.33	0.10
55℃	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.64	0.64	0.50	0.20	0.10
60℃	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.22	0.22	0.22	0.10	0.05
65℃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.2.2.2 Pulse Feedback Modes

Table 11 30 s pulse feedback rate / C-cell level (unit: C-Rate)

T\SOC	0%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	100%
-10℃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

-5℃	0.40	0.40	0.40	0.40	0.30	0.30	0.30	0.20	0.20	0.20	0.10	0.10	0.00
0℃	0.60	0.60	0.50	0.50	0.40	0.40	0.40	0.40	0.30	0.30	0.20	0.20	0.00
10℃	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.40	0.25	0.00
20℃	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	0.80	0.40	0.00
25℃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.60	0.80	0.00
30℃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.60	0.80	0.00
35℃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.60	0.80	0.00
45℃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.60	0.80	0.00
50℃	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	1.60	0.80	0.00
55℃	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.20	0.80	0.00
60℃	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.00
65℃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: In order to ensure the safe use during the whole life cycle and maximize the service life of the cell, the charging power (rate) must be adjusted according to the SOH (capacity attenuation) of the cell. It should be ensured that the BMS has this function to monitor the actual charging power (and allowable charging power limit), and trigger fault and protection functions when necessary.

4.2.3 Discharge Mode

Table 12 Discharge mode parameter table

Parameters	Product Specifications	Notes
Standard Discharge Current	0.5C	25℃ ± 2℃
Maximum Continuous Discharge Current	1C	
Discharge Cut-off Voltage	2.5 V	Temperature T > 0℃
	2.0 V	Temperature T ≤ 0℃
Standard Discharge Mode	Refer to Section of 3.9	
Standard Discharge Temperature	25℃ ± 2℃	
Absolute Discharge Temperature (Cell Temperature)	-35℃ ~ 65℃	No matter what discharge mode the cell is in, once the cell temperature exceeds the absolute discharge temperature range, stop discharging.
Absolute Discharge Voltage		No matter what kind of discharge mode the cell is in, once the cell voltage is less than the absolute discharge voltage, stop discharging.

4.2.4 Other Discharging Modes

4.2.4.1 Continuous Discharging Modes

Table 13 Continuous discharge rate / C-cell level (unit: C-Rate)

T / SOC	0%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	100%
-36℃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-35℃	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
-30℃	0.00	0.03	0.06	0.12	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
-20℃	0.00	0.06	0.12	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
-10℃	0.00	0.19	0.38	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0℃	0.00	0.28	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
25℃	0.00	0.38	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60℃	0.00	0.38	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
65℃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.2.4.2 Pulsing Discharging Modes

Table 14 30 s pulse discharge rate / C-cell level (unit: C-Rate)

T\SOC	0%	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	100%
-36℃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-35℃	0.00	0.00	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
-30℃	0.00	0.03	0.06	0.12	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
-20℃	0.00	0.06	0.12	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
-10℃	0.00	0.19	0.38	0.62	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
-5℃	0.00	0.25	0.50	1.00	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12
0℃	0.00	0.28	0.56	1.06	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18
5℃	0.00	0.31	0.62	1.12	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
10℃	0.00	0.33	0.66	1.22	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43

15℃	0.00	0.34	0.68	1.32	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63
20℃	0.00	0.36	0.72	1.41	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82	2.82
25℃	0.00	0.38	0.75	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
45℃	0.00	0.38	0.75	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
60℃	0.00	0.38	0.75	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
65℃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.3 Safety Limits

4.3.1 Application Conditions

Customer shall ensure strict compliance with the following cell application conditions:

a) Customer shall configure a battery management and monitoring system to strictly monitor, manage and protect each cell. And a battery management archive shall be established to keep all monitoring data of the cells, so as to be a reference for problems tracing and product quality responsibility division. **EVE is not responsible for product quality assurance if no complete monitoring data of the battery system during its service life is provided.**

b) The waterproof and dustproof problems of the cell shall be fully considered in the design of the pack, and the pack must meet the waterproof and dustproof grade stipulated by relevant national standards. **EVE is not responsible for the damage (such as corrosion, rust, etc.) of the cell caused by waterproof and dustproof problems.**

c) **It is forbidden to mix different types of cells in the same battery system (or vehicle), otherwise, EVE will not be responsible for the quality assurance.**

4.3.2 Voltage Limits

Items	Categories	Parameters	Protective Actions
Charging Voltage	Charging Ends	3.65 V	When the cell voltage reaches 3.65 V, stop charging.
	First Over-Charging Protection	3.80 V	When the cell voltage reaches 3.8 V, stop charging.
	Second Over-Charging Protection	3.85 V	When the cell voltage reaches 3.85 V, stop charging and lock the battery management system until the technician solves the problem.
放电电压 Discharging Voltage	Discharging Ends	Min 2.50 V	Temperature T > 0°C. When the cell voltage reaches 2.5 V, stop discharging.
		Min 2.00 V	Temperature T ≤ 0°C. When the cell voltage reaches 2.0 V, stop discharging.
	First Over-Discharging Protection	Min 2.00 V	， Temperature T > 0°C. When the cell voltage reaches 2.0 V, reduce the current to the minimum.
		Min 1.90 V	Temperature T ≤ 0°C. When the cell voltage reaches 1.9 V, reduce the current to the minimum.
	Second Over-Discharging Protection	Min 1.85 V	Min 1.85 V Temperature T > 0°C. When the cell voltage is lower than 1.85 V, stop charging and lock the battery management system until the technician solves the problem.
		Min 1.75 V	Temperature T ≤ 0°C. When the cell voltage is lower than 1.75 V, stop charging and lock the battery management system until the technician solves the problem.
BMS protection	Short Circuit protection	Short circuit is not allowed	When a short circuit occurs, the cell is disconnected by the over-current device.

	Long Charging Time Protection	Charging time within 8 h	If the charging time is longer than 8 h, the charging will be terminated.

a) If the cell charging voltage exceeds the cut-off voltage, corresponding protective actions need to be taken. EVE shall not be responsible for any cell quality issues caused by exceeding the protection voltage.

b) If the cell discharging voltage reaches the cut-off voltage, it is necessary to charge as soon as possible to prevent the cell from being over-discharged. EVE shall not be responsible for any cell quality issues caused by over-discharge.

4.3.3Temperature Limits

Table 16 Safety limit temperature parameters

Items	Parameters	Notes
Recommended Operating Temperature Range	10℃ ~ 35℃	Recommend cell usage temperature range.
Maximum Operating Temperature	65℃	If the cell temperature exceeds the maximum operating temperature, the power needs to be reduced to 0.
Minimum Operating Temperature	-35°C	If the cell temperature exceeds the minimum operating temperature, the power needs to be reduced to 0.
Maximum Safe Temperature	65℃	If the cell temperature exceeds the maximum safe temperature, irreversible and permanent damage will be caused. The user should not use it under environments
		higher than the maximum safe temperature.
Minimum Safe Temperature	-35℃	If the cell temperature exceeds the minimum safe temperature, irreversible and permanent damage will be caused. The user should not use it under environments lower than the minimum safe temperature.

Notes:

a) Prohibit charging the cell at low temperature (below -10℃) and the minimum safety temperature specified by this specification, otherwise EVE will not be responsible for any quality assurance liability.

b) The heat dissipation design of battery may effect cell electrical performance, EVE will not be responsible for any assurance liability regarding cell quality issues caused by the heat dissipation design.

4.4 Parameters Recommendation for Module Design

4.4.1 Cell Directions

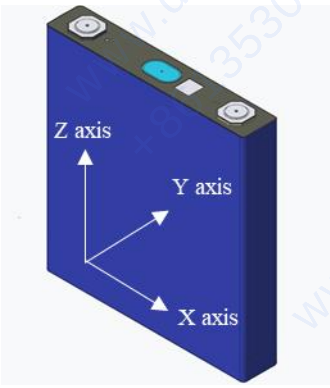


Fig.7 Diagram of LF324 Cell direction

4.4.2 Cell Compression Force

When forming modules, a compression force in the direction of vertical thickness is applied to the cells in order to make them better arranged and fixed. If the compression force is too large, the cells may be damaged or even leak. Cell compression force test conditions are as follows:

Compression area: 200.7 mm × 215.5 mm (L × H2)

Compression speed: 0.02 mm/s

Compression direction: Y direction

SOC Cell SOC: 15%~40%

Table 17 Cell compression force limit parameters

Observation	Compression Force
Recommend Compression Force	<7000 N
Instantaneous Maximum Compression Force	10000 N

The compression force of the cell shall be no larger than 10000 N, otherwise the cell may be damaged.

4.4.3 Cell Swelling force

In the process of use, the expansion force due to the change of the thickness of electrodes, gas production and other factors lead to the expansion of battery cell, and the force increases with the attenuation of the cell capacity. The cell swelling force at BOL and EOL (70%SOH) is shown below:

Table 18 Cell Swelling force parameters

Swelling force	BOL	≤ 3000 N
	EOL（80%SOH）	≤ 40000 N
	EOL（70%SOH）	≤ 45000 N

Customer shall fully consider the influence of the cell swelling force When designing the module. The product generates expansion force during use, and the expansion force is about 40000 N When the cell capacity attenuates to 80% under the test conditions of 20mm steel plate. Customers shall consider the reliability of structural strength in the product design process, and it is suggested to reserve 3% expansion space While grouping the cells.

4.4.4 Recommend Temperature Collection Points

The recommended temperature collection points are the poles or code when collecting temperature of the cell surface.

4.5 Thermodynamic Parameters

Test method:

GB/T 10295-2008、ASTM E1269-2011

Reference standards: GB/T 10295-2008 、ASTM E1269-2011

Table 19 Cell thermal conductivity parameter

Mean Thermal Conductivity	Thermal Conductivity W/(m·K)	
	X/Z 方向 X/Z Direction	Y 方向 Y Direction
	10 ~ 15 W/(m·K)	1 ~ 3 W/(m·K)
Mean Heat Capacity	Heat Capacity kJ/(kg·K)	
	0.9~1.2 kJ/(kg·K)	

5 Precautions

5.1 Product End-life Management

The cell life is limited. Customers should establish an effective tracking system to monitor and record the internal resistance and capacity of each cell during its life. The measurement method and calculation method of internal resistance and capacity need to be discussed and agreed between the customer and EVE. When the internal resistance of the cell in use exceeds 150% of the initial internal resistance of the cell or the capacity is less than 70% of the nominal 25℃） or the end of cell life which both customer and EVE agree on is coming, the cell should not to be operated. **Violation of this requirement will exempt EVE from its responsibility for product quality assurance in accordance with the product sales agreement and this specification.**

5.2 Long-term Storage

After charging, the cell should be used as soon as possible to avoid loss of usable capacity due to self-discharge. If long-term storage is required, adjust the cell SOC to 15% ~ 40%. The recommended storage conditions are: 0℃ ~ 35℃, relative humidity ≤ 60%.

The state of charge (SOC, capacity state) of the cell should be kept at 15% ~ 40% during storage. In order to prevent the performance differences after long-term storage (more than three months), perform a standard charge-discharge cycle every 3 months, then switch to storage SOC. It is recommended that the storage time after receiving the cells should not exceed half a year to avoid quality problems due to storage overdue.

5.3 Transportation and Handling Requirements

- It is not allowed to ship with inflammable, explosive and corrosive articles in the same vehicle during transportation, and stacking is prohibited during large package transportation; The product shall not be exposed to rain, snow and other liquid substances without any protection, or suffer mechanical damage;
- While handling, lift trucks or special tools shall be used to load and unload products; Handle with care, do not throw or squeeze, which may cause cell damage or personal injury. It is strictly prohibited to put cells together with corrosive substances such as acid and alkali.

5.4 Operation Precautions

- It is strictly forbidden to immerse the cell in water. When it is not in use, it should be placed in a cool and dry environment.
- Do not over-charge the cell. Otherwise, cell overheating and fire may occur. During cell installation and use,

hardware and software must be protected against multiple over-charge failures. See 4.3 of this specification for the minimum requirements of protection.

- It's necessary to set a reasonable charging time limit, otherwise, the cell may overheat, resulting in thermal runaway or fire. BMS management failure of this kind shall be considered during module design.
- If improper charge termination occurs, the root reasons shall be found and resolved before reuse to avoid negative effects on electrical and safety performances.
- It is forbidden to over-discharge. During the normal use of the cell, charge the cell regularly to keep the voltage above 2.8 V, so as to avoid over-discharge.
- It is forbidden to use or place the cell at a high temperature environment. Otherwise, cell overheat, function failure or life shorten may occur.
- The temperature of the cell shall not exceed 65℃ in any normal use, otherwise the BMS must shut down the cell and stop cell operation.
- Please use a special charger for lithium-ion batteries when charging.
- During use, please connect the positive and the negative of the cell strictly according to the labels and instructions, and reverse charging is forbidden.
- It is forbidden to use metal to directly connect the positive and the negative of the cell to short-circuit. Otherwise, strong current and high temperature may cause personal injury or fire.
- It is forbidden to transport or store the cell with metal, such as hairpins, necklaces, etc.
- It is forbidden to knock, throw, step on or bend the cell.
- It is forbidden to directly weld the cell.
- It is forbidden to directly pierce the battery with nails or other sharp objects.
- Try to protect the cell from mechanical shock, collision and pressure impact. Otherwise, the cell may be short-circuited internally, resulting in high temperature and fire.
- It is forbidden to use it in places with strong static electricity and strong magnetic fields; otherwise cell safety protection devices may be damaged and cause safety hazards.
- Customer shall securely fix the cell to a solid surface and bind the power cord in a proper place to avoid arcing and sparks caused by friction.
- It is forbidden to use plastic for cell encapsulation and electrical connection. Improper electrical connection may cause overheat during cell use.
- If the cell leaks and the electrolyte spills onto the skin or clothes, immediately wash the affected area with running water. If the cell leaks and the electrolyte enters the eyes, mouth, nose and other open parts of the human body, immediately wash with plenty of water and seek medical treatment immediately, otherwise serious injuries will be caused to the human body. No person or animal is allowed to swallow any part of the cell or any substance contained in the cell.

- If the cell emits peculiar smell, heat, discoloration, deformation, or any abnormality during use, storage, or charging, immediately remove the cell from the device or charger and stop using it.
- It is prohibited to disassemble the product without the written consent of EVE.

5.5Confidentiality Agreement

The customer shall keep the cooperation content highly confidential. Without the permission of EVE, the customer shall not disclose any content of the technical agreement to a third party. Otherwise, the customer will be held responsible according to relevant laws.

5.6 Risk Warning

5.6.1 Warning Declaration

Warning
The cell has potential hazards, and take proper precautions when operating and maintaining the cell! **The cell must be operated with proper tools and protective equipment.** **Cell maintenance must be performed by professional with cell expertise and safety training.** **Failure to comply with these warnings could result in multiple disasters.**

5.6.2 Types of Dangerous

Customer must be aware of the following potential hazards in the use and operation of cells:

a) There is a risk from electric shocks or electric arcs during operation.

b) There is a risk from the electrolyte or other chemicals.

Proper operation methods and protective equipment shall be selected to avoid short circuit, explosion or thermal runaway.

5.7 Disclaimer

If the product demand party or user does not use the product in accordance with the provisions of this specification, EVE will no longer take any relevant responsibility such as product quality assurance liability and loss compensation caused thereby. In case of any negative impact on EVE's reputation due to the above-mentioned actions, EVE reserves the right to investigate the legal liability of the product demand party.

6 Others

6.1 Rights and Obligations of EVE

- EVE shall inspect according to the inspection standards in the protocol signed with the customer, and the products provided shall meet the requirements of various parameters in the protocol.
- EVE shall provide customer with stable and reliable products confirmed by both parties.
- EVE is obliged to provide high-quality services for its products, and the service standards shall be in accordance with the standards promised by EVE.
- EVE shall provide timely technical support and service in case of any problem or failure during the use and maintenance of system products by customer.

6.2 Rights and Obligations of Customer

- Customer must conduct production in strict accordance with the technical data provided by EVE, and strictly implement the cell prevention measures, safety limits and cell operation instructions in the technical data provided by EVE.
- Customer has the obligation to ensure the safety of products by EVE and shall take corresponding fire prevention, waterproof and other measures.
- Customer has the obligation to make fair and detailed use records and monitoring data of product operation for EVE's products, which can be used as a reference for the division of product quality responsibilities. If there is no complete monitoring data within the service life of the battery system, EVE shall not be responsible for product quality assurance.
- Customer has the obligation to notify EVE's personnel to and be informed of the actual situation when products of EVE operate abnormally.
- In the process of product manufacturing, customer shall take all corresponding responsibilities for the problems or accidents caused by the operation in violation of the safety rules or the use beyond the conditions specified in this technical agreement and the combination of the product and the circuit (not the quality defects of the product itself).

Remarks: Any dispute arising from this specification document or the performance process shall be settled by both sides through friendly negotiation. If no agreement can be reached through negotiation, either side may file a lawsuit with the people's court where EVE Power Co., Ltd. is located.

6.3 Language Conflict Clause

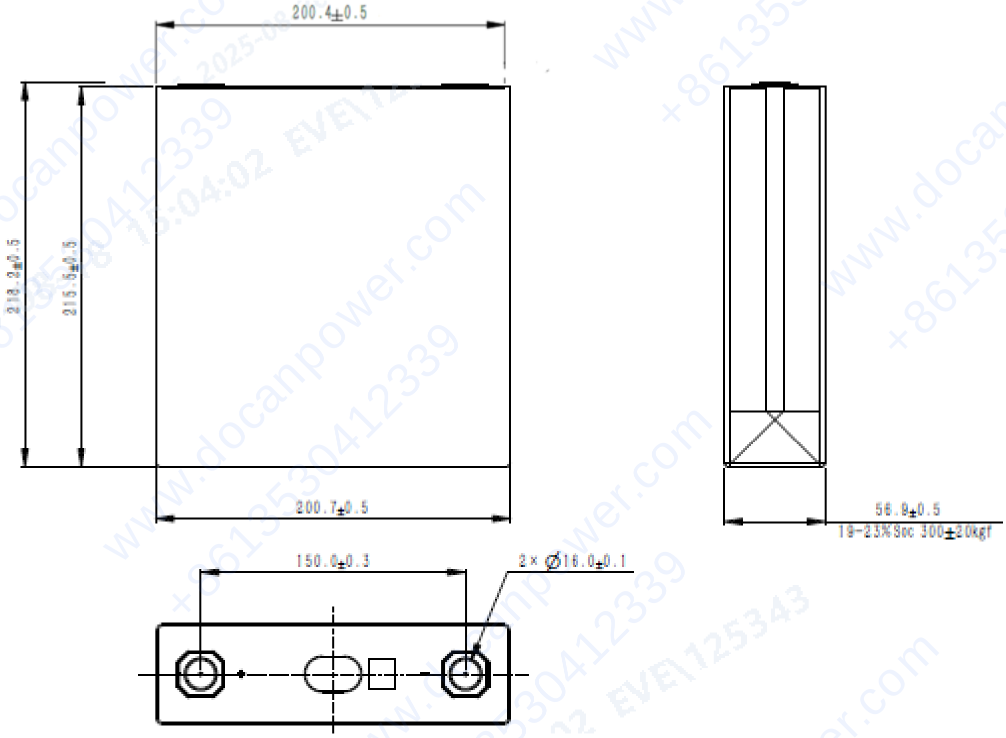
This specification is a Chinese English translation version. In case of any ambiguity between the Chinese and English agreed terms, the Chinese content shall prevail.

7 Contact Information

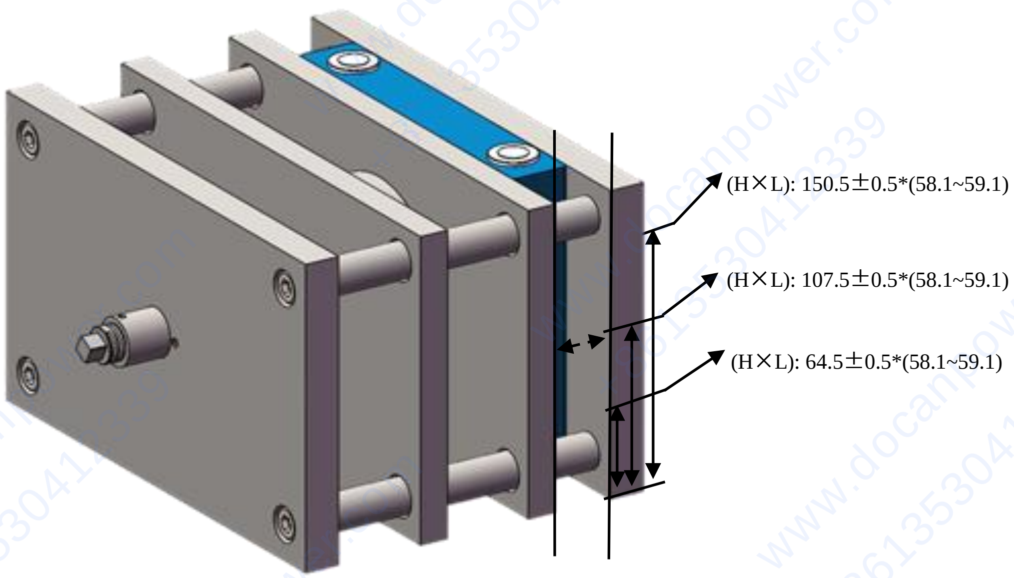
Website http://www.evepower.com

Address： EVE Power Co., Ltd., No .68 Jingnan Avenue, Duodao District, Jingmen High-tech Zone, Jingmen City, Hubei Province.

Appendix 1: Cell Drawing of LF324



Appendix 2: LF324 Battery with Clamping Plate



Note: Same thickness measurement method applies to the battery with clamping plates on fixture's both sides

Fig.9 Measurement Position Schematic Diagram