EVE Energy Co., Ltd Product Specification

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Product ：	Prismatic Aluminum-clad LFP Battery
Model ：	LF50K
Specification ：	3.2V/50Ah
Draft ：	Kai Chen
Checked ：	Dingding Yuan
Approved ：	Zhengzhong Lv
Client confirmed ：	

email：sales@evebattery.com

Address：No.68, Jingnan Avenue, Duodao District, Jingmen High-tech Zone, Hubei Province, China

Modification Record

Date	Contents	Version
2018-06-28	First issue	A
2018-09-10	The Pole hole M6 changed to M4	B
2019-03-23	Revised a few technical requirements	C
2019-12-02	Revised a few technical requirements	D

Contents

1 Scope....1
2 Model....1
3 Nominal Technical Parameter....1
4 Test Conditions....2
5 Battery Performance....3
6 Transportation....4
7 Storage....4
8 Attentions....4
Appendix 1：Two-dimensional Diagram....5
Appendix 2：Code Rules....6
Appendix 3：Appearance Photos....6
Appendix 4：Packing Diagram....7
Appendix 5：Electrical Performance Diagram....7

1 Scope

This specification describes product type, basic performances, test method and precautions of the prismatic aluminum-clad $LiFePO_4$ lithium ion battery manufactured by EVE Energy Co., Ltd. The product can be applied to vehicle power system and energy storage system,etc.

2 Model

2.1 Product Name： Prismatic Aluminum-clad $LiFePO_4$ Lithium Ion Battery

2.2 Product Model： LF50K

3 Nominal Technical Parameter

No.	Item		Parameter	Remark
1	Nominal capacity		50Ah	(25±2)℃, Standard charge/discharge.
2	Nominal voltage		3.2V	
3	AC Impedance resistance (1KHz)		≤0.7mΩ	
4	Standard charge/discharge	Current of charge/discharge	0.5C/0.5C	(25±2)℃
		Cut-off voltage of charge/discharge	3.65V/2.5V	
5	Maximum current of charge/discharge	Constant charge/discharge	3C/3C	Refer to constant/pulse charge or discharge MAP
		Pulse charge/discharge (30s)	5C/5C	
6	Recommend SOC window		10%～90%	N.A.
7	Charge temperature		0℃～55℃	Refer to constant/pulse charge or discharge MAP
8	Discharge temperature		-20℃～55℃	
9	Storage temperature	1 month	-20℃～45℃	N.A.
		1 year	0℃～35℃	
10	Storage humidity		＜95%	

No.	Item		Parameter	Remark
11	Self-discharge rate per month		≤3%/per month	(25±2)℃，30%～50%SOC storage
12	Size	Width	135.3±0.5mm	Refer to appendix 1
13		Thickness (30%-40%SOC)	29.3±0.7mm	
14		Height (total)	185.3±0.5mm	
15		Height (subject)	180.8±0.5mm	
16		Tabs distance	67.5±1.0mm	
17	Weight		1395±50g	

4 Test Conditions

4.1 Test Environment

Temperature：(25±2) ℃

Relative humidity：15%～90%

Atmospheric pressure：86KPa～106KPa

4.2 Standard Charge

At (25±2)℃, the cell is charged by a constant current of 0.5C (A) to the cut-off voltage 3.65V, then kept at this voltage until the current is less than 0.05C (A).

4.3 Standard Discharge

At (25±2)℃, the cell is discharged by a constant current of 0.5C (A) to the cut-off voltage 2.5V.

5 Battery Performance

5.1 Electrical Performance

No.	Item	Requirements	Measuring Procedure
1	Rate discharge ability at 25℃	Discharge capacity / Nominal capacity×100% A) 0.5C(A)≥100% B) 1.0C(A) ≥100% C) 3.0C(A) ≥97%	After standard charged, the cell undergo a rest for 1h, then is discharged by current 0.5C(A)、1.0C(A)、3.0C(A) respectively to cut-off voltage 2.5V. This test is allowed to be repeated for 3 times if the discharge capacity fails to meet the technical requirements.
2	Discharge ability at different temperature	Discharge capacity / Nominal capacity×100% A) 55℃ ≥95% B) 0℃≥80% C) -20℃ ≥70%	A) After standard charged, the cell undergo a rest for 5h at (55±2)℃, then is discharged by current 1.0C(A) to cut-off voltage 2.5V; B) After standard charged, the cell undergo a rest for 24h at (0±2)℃, then is discharged by current 1.0C(A) to cut-off voltage 2.0V. C) After standard charged, the cell undergo a rest for 24h at (-20±2)℃, then is discharged by current 1.0C(A) to cut-off voltage 2.0V.
3	The capacity retention and recovery at 25℃	Capacity Retention≥95% Capacity Recovery≥97%	After standard charged，the cell undergo a rest for 28 days, then is discharged by current 1.0C(A) to cut-off voltage 2.5V. The discharge capacity is capacity retention. After standard charged again，the cell undergo 30min's rest，then is discharged by current 1.0C(A) to cut-off voltage 2.5V. The discharge capacity is capacity recovery.
4	Cycle life at 25℃	≥7000 cycle @1C/1C	At (25±2)℃, 300kgf clamp force: the cell is charged by current 1.0C (A) to 3.65V, then kept at this voltage until the current is less than 0.05 C(A), followed by 30min rest, subsequently the cell is discharged by current 1.0C (A) to 2.5V . Cycle continues until the capacity decays to 80% of the nominal capacity
5	Cycle life at 45℃	≥2500 cycle @1C/1C	At (45±2)℃, 300kgf clamp force: the cell is charged by current 1.0C (A) to 3.65V, then kept at this voltage until the current is less than 0.05 C(A), followed by 30min rest, subsequently the cell is discharged by current 1.0C (A) to 2.5V . Cycle continues until the capacity decays to 80% of the nominal capacity

6	End-of-life management	Discharge capacity / Nominal capacity <70%	The cell shall be stopped using when the life limit is exceeded.

5.2 Safety Performance

No.	Item	Requirements	Measuring Procedure
1	Overdischarge	No fire、explosion、electrolyte leakage	Reference: GB/T 31485-2015 《 safety requirements and test methods for power batteries for electric vehicles》
2	Overcharge	No fire、explosion	
3	Shortcircuit	No fire、explosion	
4	Dropping	No fire、explosion、electrolyte leakage	
5	Heating	No fire、explosion	
6	Crushing	No fire、explosion	
7	Prisking	No fire、explosion	
8	Seawater immersion	No fire、explosion	
9	Temperature cycle	No fire、explosion、electrolyte leakage	
10	Low pressure	No fire、explosion、electrolyte leakage	

6 Transportation

The cells should be packed into boxes under the charge of 30% ~ 50%SOC. During the transportation, they should be protected from severe vibration, shock , extrusion, sun or rain.

7 Storage

Cells should be stored (more than 1 month) indoor with a dry and clean environment at 0 ℃~35 ℃, and charged and discharged every 6 months. Keep the last charge under 30%～50%SOC.

8 Attentions

1、It is necessary to ensure that the voltage, current and temperature of the cell are monitored and protected when the cell is charged and discharged.

2、Please keep the cell away from heat source, fire source , strong acid, strong alkali and other corrosive environment.

3、Do not short connect or install the battery with incorrect polarity at any time.

4、Do not mix up with cells from different models or manufacturers.

5、Do not use external force to make the cell fall, impact, puncture, do not disassemble the cell or change the external structure.

6、Please keep the cell's charge under 30% ~ 50%SOC, and avoid direct sunlight or high temperature and humidity environment when the battery is not used for a long time,

7、Please wear protective devices such as rubber gloves when operating the battery.

8、Please immediately stop using if there have leakage, smoking or damage with cell , and contact our company to deal with.

Appendix 1：Two-dimensional Diagram

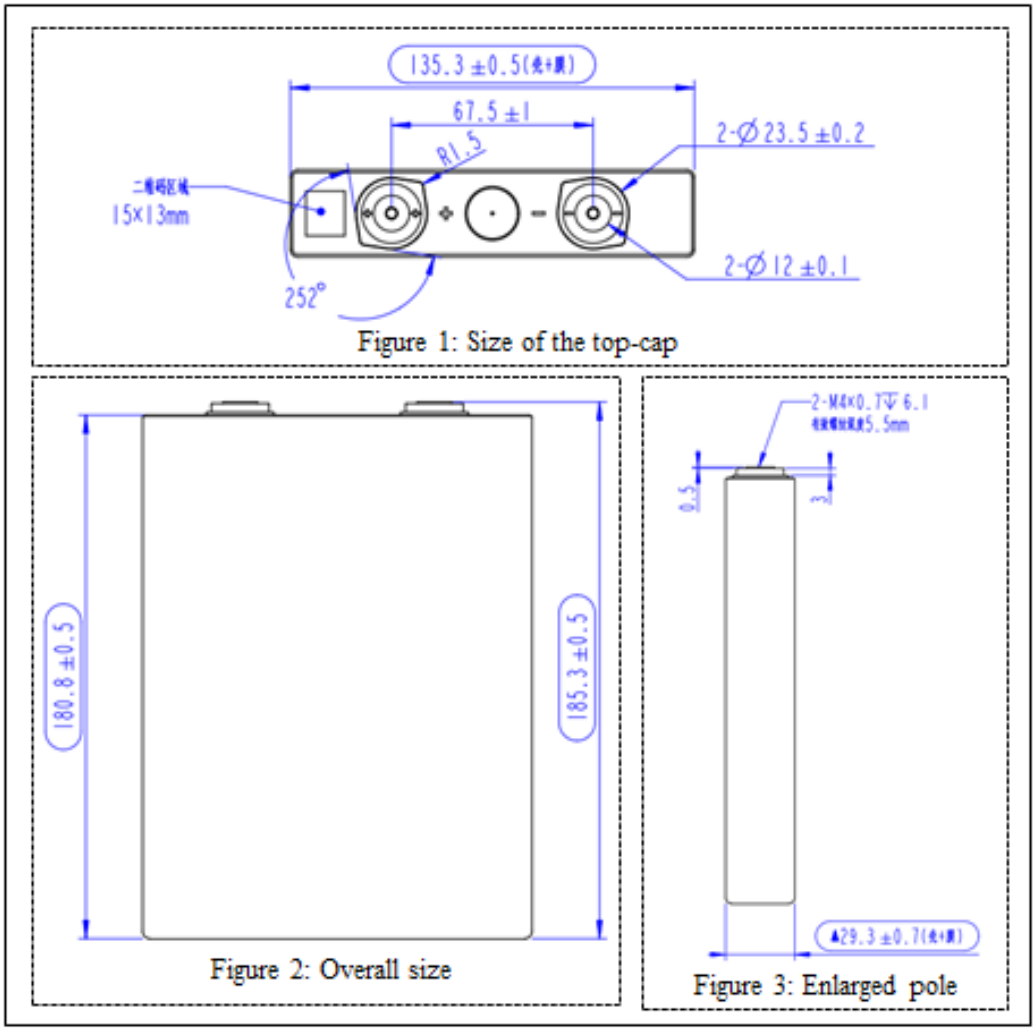


Figure 1: Size of the top-cap

Figure 2: Overall size

Figure 3: Enlarged pole

Appendix 2： Code Rules

0000001: No.18 – 24，serial number of the same model produced on the same day

89C: No. 15 - 17 manufacture date , Sep 12, 2018，

02YCB68117400J

J：No.14，production address，J：Jingmen，H：Huizhou

117400：No.8 - 13，traceability code，11/12：Q1 factory ，production line 11/12，and so on，74: the last two number of task oeder

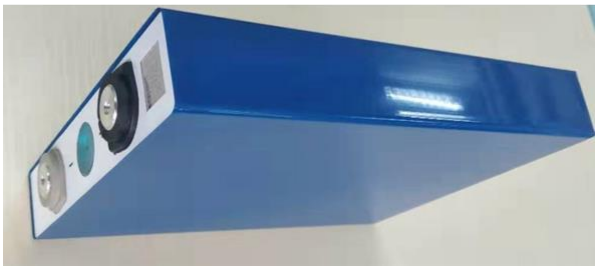
68：No. 6-7，code of cell specification ，LF50K cell

B：NO.5，code of cell type，$LiFePO_4$

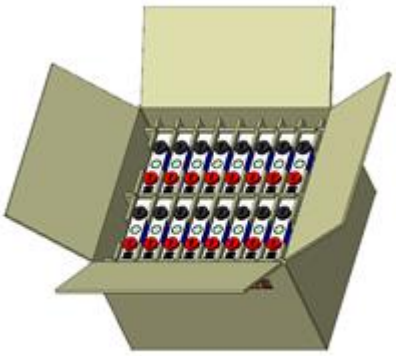
C：NO.4，code of production type，cell

02Y：No.1-3，vendor code，Jinquan；04Q，EVE

Appendix 3：Appearance Photos



Appendix 4：Packing Diagram

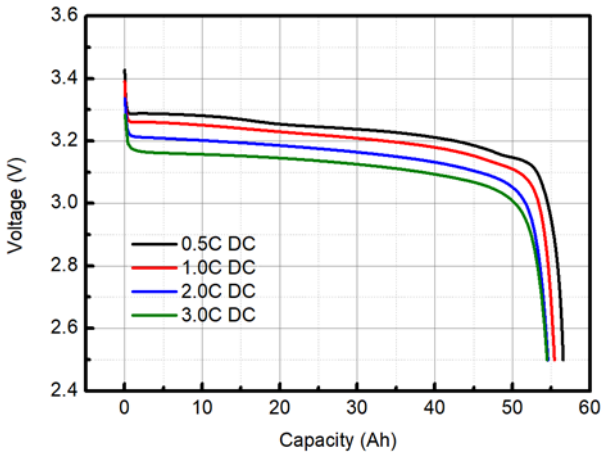


length*width*height ： 355*342*240mm

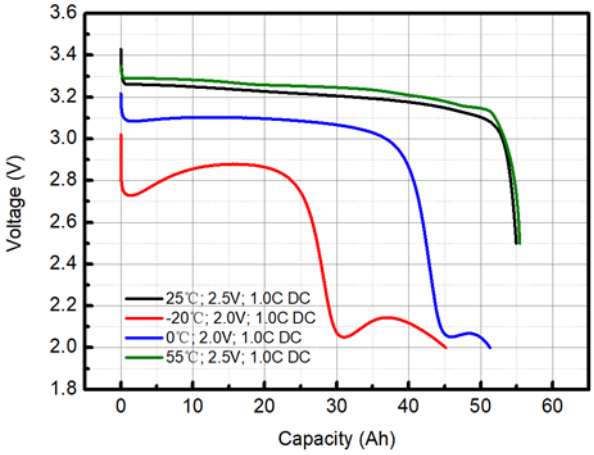
length*width*height ： 1100*1100*1080mm

Appendix 5：Electrical Performance Diagram

1、Rate discharge curve at 25℃



2、Discharge curves at different temperature



3、Cycle curve（charge/discharge:1C/1C, 3.65V-2.5V）