产品名称 Product	C40KS-V2.1	文件编号 Specification No.	PBRI-C40KS-V2.1-D06-03	版本 Version	A

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产品交付规格书

Product Specification

Cylindrical Lithium-ion Rechargeable Cell

圆柱锂离子可充性电芯

产品名称 Product: C40KS-V2.1

编制 Drafted by	产品设计审核 Product Design Checked by	品质审核 Quality Checked by	销售审核 Sales Checked by	批准 Approved by
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公司名称 Company Name:
批准 Approved by:
日期 Date:

2025 年 12 月 Dec., 2025

惠州亿纬锂能有限公司 EVE Power Co., Ltd

产品名称 Product	C40KS-V2.1	文件编号 Specification No.	PBRI-C40KS-V2.1-D06-03	版本 Version	A

客户要求 Customer's Requirement

要求客户写出他们的需求信息并提前与 EVE 沟通。如果客户有一些特别的应用或者操作条件不同于此文件中所描述的, EVE 可以根据客户的特别要求进行产品的设计和生产。

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

序号 No.	特殊要求 Special Requirements	标准 Standard
1		
2		
3		
4		
5		
6		
7		
8		

客 户 代 码: _____ 签字: _____ 日期: _____
Customer Code **Sign** **Date**

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变更履历 Change History

版本 Version	日期 Date	内容描述 Description	编制 Draft by
A	2025.12.01	新版发行 First Release	吴凌伟

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术语定义 Term Define

术语 Terms	定义 Definition
电池单体 Cell	直接将化学能和电能的基本单元装置，包括电极、隔膜、电解质、外壳和端子，并被设计成可充电。 A basic unit device that directly combines chemical and electrical energy, including electrodes, separator, electrolytes, can and terminals, and is designed to be rechargeable.
容量 Discharge capacity	电池在规定试验条件和试验方法下测得的放电容量。 The discharge capacity tested with specified test method.
能量 Discharge energy	电池在规定试验条件和试验方法下测得的放电能量。 The discharge energy tested with specified test method.
开路电压(OCV) Open circuit voltage	没有接入任何负载和电路时测得的电池的电压，缩写用 OCV 表示。 The voltage of the cell measured when unloaded or circuit unconnected. The abbreviation is expressed by OCV.
DCR	工作条件下电池的电压变化与相应的电流变化之比，缩写用 DCR 表示。 The ratio of the voltage changes of the cell to the corresponding current change under working conditions, the abbreviation is DCR.
标准充电 Standard charge	本规格书第 4.5 条所述的充电模式。 The charge mode described in 4.5 of this specification.
标准放电 Standard discharge	本规格书第 4.6 条所述的放电模式。 The discharge mode described in 4.6 of this specification.
环境温度 Environment temperature	电池所处的周围环境温度。 Surrounding environmental temperature where the cell is located.
电芯表面温度 Cell surface temperature	由温度传感器测量的电池大面或侧面中心的温度。 Temperature measure by the temperature sensor installed at the center of cell surface.
新电池状态 Fresh cell	是指电池自产品的制造日期算起 3 个月以内的状态。 It refers to the cell within 3 months from the date of manufacture of the product.
荷电状态(SOC) State of charge	在无负载的情况下，以安培小时为单位计量的电池容量状态与额定容量的比值，缩写用 SOC 表示。如：若将容量为 20 Ah 时视为 100% SOC，则容量为 0 Ah 时视为 0% SOC。 Under unloaded conditions, the ratio of the cell capacity state to the rated capacity measured in ampere-hours. The abbreviation is expressed by SOC. For example, if the capacity of 20Ah is considered as 100% SOC, the capacity of 0Ah, as 0%SOC.
循环 Cycle	电池按规定的充放标准充放一次为一个循环。循环包括短时的正常充电或者再生充电和放电过程的组合，在充电过程中有时只有正常充电而无再生充电的情况。放电可以由一些部分放电组合在一起形成。 The cell is charged and discharged in a cycle according to the prescribed charging and discharging standards. The cycle includes short-term normal charging or regenerative charging combination with discharging processes. In the charging process, sometimes there is only normal charging and no re-generative charging. The discharge can be formed by combining some partial discharges.
测量单位 The unit of measurement	电压单位 Voltage: 伏特 “V” (Volt) 电流单位 Current: 安培 “A” (Ampere) 容量单位 Capacity: 安培-小时 “Ah” (Ampere-Hour) 能量单位 Energy: 瓦特-小时 “Wh” (Watt-Hour) 电阻单位 Resistance: 欧姆 “Ω” (Ohm)，毫欧姆 “mΩ” (Milliohm) 温度单位 Temperature: 摄氏度 “℃” (degree Celsius) 长度单位 length: 毫米 “mm” (millimeter) 时间单位 Time: 秒 “s” (second) 频率单位 Frequency : 赫兹 “Hz” (Hertz) 功率单位 Power : 瓦特 “W” (Watt)

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1. 基本信息 Basic Information

1.1. 使用范围 Scope

本规格书详细描述了 EVE 生产的圆柱锂离子可充性电芯的产品性能指标以及产品使用条件及风险警示。该规格书仅适用于 C 样阶段样品出货，量产阶段产品规格需要重新定义，提供正式的产品规格书。

This document describes in detail the product performance specification of *Cylindrical Lithium-ion Rechargeable Cell* produced by EVE, as well as the product use conditions and risk warnings. The specification is only applicable to the shipment of samples in the C sample phase, and the product specification in the mass production stage needs to be redefined and the official product specification should be provided.

1.2. 产品类型 Cell Classification and Model

1.2.1 产品类型 Cell Classification 圆柱锂离子可充性电芯 Cylindrical Lithium-ion Rechargeable Cell

1.2.2 产品名称 Cell Model C40KS-V2.1

2. 电池规格参数 Cell Specification

2.1. 基本性能 Nominal Specification

序号 No.	项目 Item	产品规格 Specification	备注 Remark
2.1.1	最小容量 Minimum Discharge Capacity	20Ah@0.33C	0.33C, 2.5~3.65V, 25±2℃
2.1.2		19.5Ah@1C	1C, 2.5~3.65V, 25±2℃
2.1.3	工作电压 Operation Voltage Range	2.5~3.65V	T＞0℃
		1.8~3.65V	T≤0℃
2.1.4	标准充电电流 Standard Charge Current	0.5C	25℃
2.1.5	标准放电电流 Standard Discharge Current	0.5C	25℃
2.1.6	最大持续充电电流 Maximum Continuous Charge Current	1C	2.5~3.65V, 25±2℃
2.1.7	最大脉冲放电电流 Maximum Discharge Current	4C	30s, > 50%SOC, 25℃
2.1.8	初始 ACR Initial ACR	≤1.9 mΩ	Shipping SOC, AC, 1kHz

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序号 No.	项目 Item	产品规格 Specification		备注 Remark
2.1.9	初始 DCR Initial DCR	≤6 mΩ		30%SOC, 2C, 30s, 25°C
2.1.10	出货 SOC 状态 Shipping SOC Status	30%SOC		/
2.1.11	月自放电 Monthly Self Discharge	≤3.0%		出货态新电池, 25°C存储 3 个月后 Shipment status, the fresh cell after 3 months storage at 25°C
2.1.12	电池重量 Cell Weight	372.5 g±6 g		/
2.1.13	电池尺寸 (含绝缘膜) Cell Dimension (With Insulation Film and Insulation Gasket)	总高 H Total Height(H)	135.0±0.5 mm	包含极柱 With Terminal
		肩高 h Shoulder Height(h)	132.6±0.3mm	不包含极柱 Without Terminal
		直径 φ Diameter(φ)	40.5±0.3mm	/
2.1.14	工作温度 Operation Temperature	充电 Charge	0~55°C	/
		放电 Discharge	-20~60°C	/
2.1.15	存储温度 Storage Temperature	1 年 1 year	0~25°C	出货 SOC 状态 Shipping SOC Status
		3 个月 3 months	0~45°C	
		1 个月 1 month	-20~45°C	

备注: 电池性能测试选用新电池状态进行。

Note: Testing the cell using the fresh cell.

2.2. 电性能指标 Electrical Specification

序号 No.	项目 Items	产品规格 Specification	测试条件 Test Condition
2.2.1	低温放电容量 -20°C Discharge Capacity	放电容量比值 -20°C/25°C ≥70% Capacity Ratio -20°C/25°C ≥70%	-20°C, 1C, 1.8V, 24h Rest

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序号 No.	项目 Items	产品规格 Specification	测试条件 Test Condition
2.2.2	高温放电容量 45℃ Discharge Capacity	放电容量比值 45℃/25℃ ≥95% Capacity Ratio 45℃/25℃ ≥95%	45℃, 1C, 2.5V, 6h Rest
2.2.3	室温荷电保持与容量恢复能力 25℃ Capacity retention and recovery capability	容量保持率 ≥95%, 容量恢复率 ≥97% Capacity Retention ≥95%, Capacity Recovery ≥97%	100%SOC, 25℃, 28days
2.2.4	高温荷电保持与容量恢复能力 45℃ Capacity retention and recovery capability	容量保持率 ≥90%, 容量恢复率 ≥92% Capacity Retention ≥90%, Capacity Recovery ≥92%	100%SOC, 45℃, 28days
2.2.5	25℃ 0.5C/0.5C 循环 25℃ 0.5C/0.5C Cycle Life	4000 cycles ≥80%	/
2.2.6	25℃ 1C/1C 循环 25℃ 1C/1C Cycle Life	2500 cycles ≥80%	/

备注：电池性能测试选用新电池状态进行。

Note: Testing the cell using the fresh cell.

2.3. 安全与可靠性 Safety and Reliability Specification

序号 No.	项目 Items	产品规格 Specification	测试条件 Test Condition
2.3.1	Over-charge Test 过充电测试	No Explosion, No Fire 不爆炸、不起火	GB/T 36276-2018
2.3.2	Over-discharge Test 过放电测试	No Explosion, No Fire 不爆炸、不起火	GB 38031-2020
2.3.3	Short-circuit Test 短路测试	No Explosion, No Fire 不爆炸、不起火	GB 38031-2020
2.3.4	Drop Test 跌落测试	No Explosion, No Fire 不爆炸、不起火	GB/T 36276-2018
2.3.5	Crush Test 挤压测试	No Explosion, No Fire 不爆炸、不起火	GB 38031-2020
2.3.6	Heating Test 加热测试	No Explosion, No Fire 不爆炸、不起火	GB 38031-2020
2.3.7	Low Pressure Test 低气压测试	No Explosion, No Fire, No Leakage 不爆炸、不起火、不漏液	UN 38.3-2019

备注：电池性能测试选用新电池状态进行。

Note: Testing the cell using the fresh cell.

2.4. 电池图纸 Cell Drawing

见附录。 See Appendix.

2.5. 外观 Appearance

电池应无明显擦伤、裂痕、锈渍、变色或电解液泄漏这类对电池商用价值有影响的缺陷。

The cell should have none of obvious scratches, cracks, rust stains, discoloration, or electrolyte leakage, which may adversely affect commercial value of the cell.

3. 试验条件 Testing Conditions

3.1. 环境条件 Environmental Conditions

除另有规定外，试验应在温度为 25±5°C，相对湿度≤65%RH，大气压力为 86 kPa~106 kPa 的环境中进行。本规格书所提到的室温，是指 25±2°C。

Unless otherwise specified, the test should be carried out in an environment with a temperature of 25°C±5°C, a relative humidity of ≤65%RH, and an atmospheric pressure of 86 kPa to 106 kPa. The ambient temperature mentioned in this specification refers to 25°C±2°C.

3.2. 测试设备 Measurement Instrument

试验装置应符合下列要求: The accuracy of measuring device should meet the following requirements:

A. 电压测量装置 Voltage measuring device:±0.1%;

B. 电流测量装置 Current measuring device:±0.1%;

C. 温度测量装置 Temperature measuring device:±0.5°C;

D. 尺寸测量装置 Dimension measuring device:±0.01mm;

E. 重量测量装置 Weight measuring device:±0.1g.

4. 测试方法 Testing Methods

4.1. 测试夹具安装 Testing Fixture Installation

电池测试时需使用固定夹具。单体电池放入测试固定支架中。

When the cell is tested for electrical performance, it is necessary to use a fixed fixture. The single cell is placed in the test holder.

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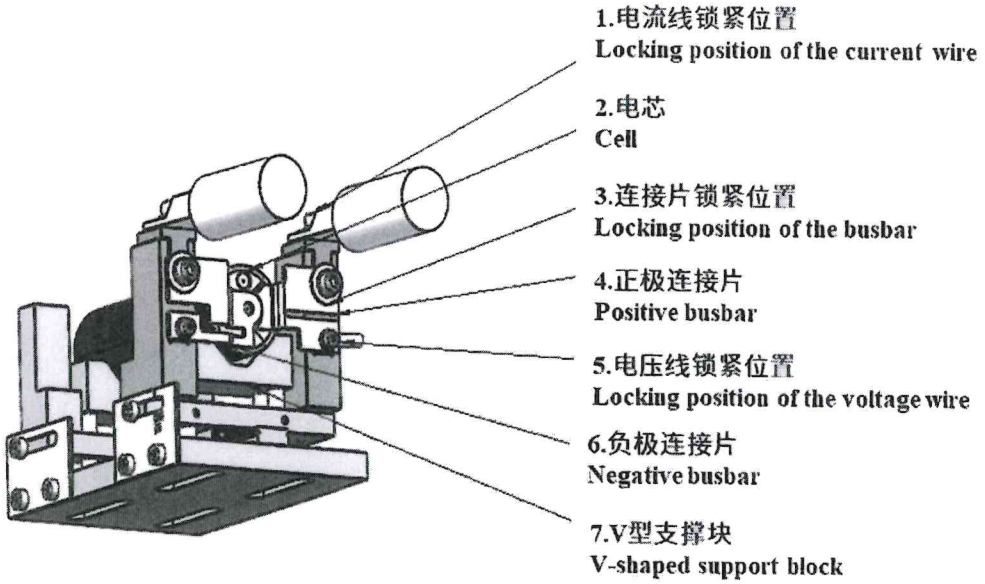


图1 电池测试夹具示意图 Cell testing fixture diagram

4.2. 电池测试温度采集 Temperature Monitor

如果没有特殊要求，电池测试时将按照如下描述进行温度采集。对电池表面进行温度采集时，建议温度采集点布置在正极（温度点 T1）、负极（温度点 T2）、圆柱面中间位置（温度点 T3），如下图。

If there are no special requirements, the temperature sensor will be pasted during test as below. When collecting temperature on the cell surface, the temperature collection point in the positive cover plate (temperature point T1), negative cover plate (temperature point T2), and cylinder surface (temperature point T3), as shown in the following figure.

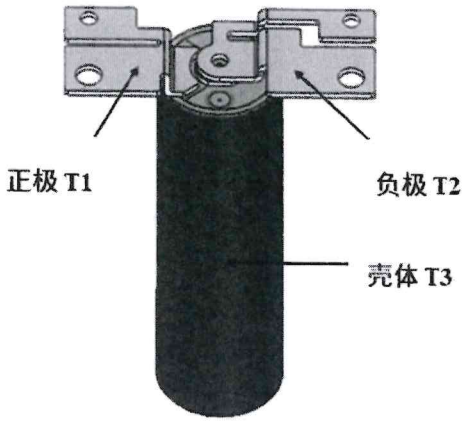


图2 电池温度采集点示意图 Cell temperature monitoring diagram

4.3. 尺寸 Dimension

试验设备: 三坐标 (CMM)

试验方法: 使用 CMM 设备分别测试电池的直径和高度。

Testing Instrument: Coordinate Measuring Machine (CMM)

Testing Method: Use the CMM test device to test the diameter and height respectively.

4.4. 重量 Weight

试验设备: 电子秤

试验方法: 使用电子秤测量电池的重量。

Test Instrument: Electronic scale

Test Method: Use the electronic scale to measure the weight of the cell. Record the weight value.

4.5. 标准充电 Standard Charge

标准充电是在环境温度 25±2°C的条件下, 对电池以 0.5C 的电流恒流充电至 3.65V, 然后在 3.65V 下转恒压充电, 直至充电电流小于等于 0.05C。搁置 30min。

At 25±2°C, charged with constant current 0.5C to 3.65V, then continue charged with constant voltage until the current reach to no more than 0.05C, rest 30min.

4.6. 标准放电 Standard Discharge

标准放电是在环境温度 25±2°C的条件下, 电池以 0.5C 的电流恒流放电至 2.5V。搁置 30min。

At 25±2°C, discharged with constant current 0.5C to 2.5V, rest 30min.

4.7. SOC 调节方式 SOC Adjust Method

如果没有特殊要求, SOC 将按照如下方式进行调节。在环境温度 25±2°C的条件下, 电池以 0.5C 恒流放电至 2.5V, 搁置 30min。按照标准充电方式和标准放电方式重复 3 次。记录三次放电容量的平均值, 标记为 C_0。

调节 SOC: 按照标准充电方式充满电, 以 0.5C_0 的电流恒流放电至目标电量,

目标电量 = (1-目标 SOC)*C_0, 搁置 60min。

If there are no special requirements, the SOC will be adjusted as follows. At 25±2°C, the cell was discharged with 0.5C to 2.5V. Repeat 3 times according to standard charge mode and standard discharge mode. Record the average of the three discharge capacities, recorded as C_0.

Adjust SOC: charging with standard charge mode, discharge with 0.5C_0 to target SOC, rest 60min.

Target SOC = (1- Target SOC) * C_0

4.8. 初始 ACR Initial ACR

在(25±2)℃下，将电池用频率为 1KHz 的电压内阻测试仪的正、负极分别接触电池的正、负极，读取电池的交流内阻读数。

At 25±2℃, connecting the cell's positive and negative terminal with the Voltage Internal Resistance Tester, which is the 1kHz frequency.

4.9. 初始 DCR Initial DCR

在(25±2)℃下，按照 SOC 调节方式将电池调节至 30%SOC，记录搁置末期第 30min 的电压 V1。2C 恒流放电 30s。记录第 30s 放电末期的电压 V2。

计算 DCR: DCR = $(V_1-V_2)/2C$ mΩ。

At 25±2℃, adjust the cell to 30%SOC, according to the SOC adjust method. Record the voltage as V_1 at the end of 30min rest. Then, discharge the cell with 2C for 30s, record the voltage as V_2 at the end of 30s discharge.

Calculate DCR: DCR = $(V_1-V_2) / 2C$ mΩ.

4.10. 放电容量 Discharge Capacity

在(25±2)℃下，电池 0.33C 容量、1C 容量测试按照下列方法进行:

0.33C 放电容量: 在环境温度 25±2℃, 0.5C 恒流恒压充电至 3650mV, 0.05 C 截止，搁置 30 min, 0.33C 恒流放电至 2500mV 截止，搁置 30 min。重复上述“充电-搁置-放电-搁置”工步 5 次，记录后 3 次放电容量均值，定义为 0.33C 放电容量。

1C 放电容量: 在环境温度 25±2℃, 0.5C 恒流恒压充电至 3650mV, 0.05 C 截止，搁置 30 min, 1C 恒流放电至 2500mV 截止，搁置 30 min。重复上述“充电-搁置-放电-搁置”工步 5 次，记录后 3 次放电容量均值，定义为 1C 放电容量。

The discharge capacity is tested according to the follow step.

0.33C Discharge Capacity: At the ambient temperature of 25±2°C, charging the cell with the constant current of 0.5C to 3650mV, stop until the current no more than 0.05C, rest for 30min, discharging the cell with the constant current of 0.33C to 2500mV, stop, rest for 30min. Repeating the above Charge-Rest-Discharge-Rest step for five times, recording the average of discharge capacities of last three times, which is defined as 0.33C Discharge Capacity.

1C Discharge Capacity: At the ambient temperature of 25±2°C, charging the cell with the constant current of 0.5C to 3650mV, stop until the current no more than 0.05C, rest for 30min, discharging the cell with the constant current of 1C to 2500mV, stop, rest for 30min. Repeating the above Charge-Rest-Discharge-Rest step for five times, recording the average of discharge capacities of last three times, which is defined as 1C Discharge Capacity.

4.11. 低温放电容量 -20℃ Discharge Capacity

在(25±2)℃下，电池标准放电后，进行标准充电。

然后使用 1C 放电至 2.5V，搁置 30min，记录放电容量为 C_2。再将电池进行标准充电。

在(-20±2)℃下，将电池搁置 24h。使用 1C 放电至 1.8V，搁置 30min，记录放电容量为 C_4。

计算低温放电容量比值: C_4/C_2

At 25±2℃, cell discharged with standard discharge mode, charged with standard charge mode.

Then, discharge with 1C to 2.5V, rest 30min, record the discharge capacity as C_2. Charged with standard charged.

At -20±2℃, rest 24h. Then discharge to 1.8V with 1C, rest 30min, record the discharge capacity as C_4.

Calculate -20℃ discharge capacity ratio: C_4/C_2

4.12. 高温放电容量 45℃ Discharge Capacity

在(25±2)℃下，电池标准放电后，进行标准充电。

然后使用 1C 放电至 2.5V，搁置 30min，记录放电容量为 C_2。再将电池进行标准充电。

在(45±2)℃下，将电池搁置 6h。使用 1C 放电至 2.5V，搁置 30min，记录放电容量为 C_5。

计算低温放电容量比值: C_5/C_2

At 25±2℃, cell discharged with standard discharge mode, charged with standard charge mode.

Then, discharge with 1C to 2.5V, rest 30min, record the discharge capacity as C_2. Charged with standard charged.

At 45±2℃, rest 6h. Then discharge to 2.5V with 1C, rest 30min, record the discharge capacity as C_5.

Calculate 45℃ discharge capacity ratio: C_5/C_2

4.13. 室温荷电保持与容量恢复性能 25℃ Capacity Retention and Recovery Capability

在(25±2)℃下，电池进行“标准放电→标准充电→标准放电”,记录第二次放电容量为 C_2。

在(25±2)℃下，电池进行标准充电，然后搁置 28 天。

在(25±2)℃下，电池进行标准放电，记录剩余容量 C_6。

在(25±2)℃下，使用标准充电和标准放电进行 3 次充放电循环，以第 3 次放电的值作为结果，记录为恢复容量 C_7。

计算容量保持率: C_6/C_2

计算容量恢复率: C_7/C_2

At 25±2℃, cell operates with the following orders: standard discharge→standard charge→standard discharge, record the second discharge capacity as C_2.

At 25±2℃, charge with standard charge model, rest 28 days.

At 25±2℃, discharge with standard discharge model, record the residual capacity as C_6.

At 25±2℃, cycled with standard charge and standard discharge model until 3 cycles, record the third discharge capacity as C_7.

Calculate capacity retention: C_6/C_2

Calculate capacity recovery: C_7/C_2

4.14. 高温荷电保持与容量恢复性能 45℃ Capacity Retention and Recovery Capability

在(25±2)℃下，电池进行“标准放电→标准充电→标准放电”,记录第二次放电容量为 C_2。

在(25±2)℃下，电池进行标准充电，调整温度为(45±2)℃，然后搁置 28 天。

调整温度为(25±2)℃，搁置 12h，电池进行标准放电，记录剩余容量 C_8。

在(25±2)℃下，使用标准充电和标准放电进行 3 次充放电循环，以第 3 次放电的值作为结果，记录为恢复容量 C_9。

计算容量保持率: C_8/C_2

计算容量恢复率: C_9/C_2

At 25±2℃, cell operates with the following orders: standard discharge→standard charge→standard discharge, record the second discharge capacity as C_2.

At 25±2℃, charge with standard charge model, adjust temperature to 45±2℃, rest 28 days.

Adjust temperature to 25±2℃, rest 12h, discharge with standard discharge model, record the residual capacity as C_8.

At 25±2℃, cycled with standard charge and standard discharge model until 3 cycles, record the third discharge capacity as C_9.

Calculate capacity retention: C_8/C_2

Calculate capacity recovery: C_9/C_2

4.15. 25℃ 0.5C/0.5C 循环寿命 0.5C/0.5C Cycle Life at 25℃

在环境温度 25±2℃的条件下，以 0.5C 恒流充电至 3650mV，再恒压充电至电流 0.05C 截止；搁置 30min，然后以 0.5C 放电至 2500mV，放电结束后搁置 30min 后进行下一个循环，直至循环 4000 次。

循环开始前，需要在 25±2℃以 10A 标定其基准容量（计算容量保持率的分母），确定 0.5C 电流的值，且每 100 圈需要重新定容，重新确定 0.5C 电流的值，以校正后续循环的电流。

At the ambient temperature of 25±2℃, the cell undergoes the following cycling procedure repeatedly until completing 4000 cycles:

1. Charge at a constant current of 0.5C until reaching 3650mV.
2. Then, charge at a constant voltage until the current is no more than 0.05C.
3. Allow a 30-minute rest.
4. Discharge at a constant current of 0.5C until reaching 2500mV.
5. After the discharge, let it rest for 30 minutes before proceeding to the next cycle.

This cycle is repeated for a total of 4000 times under the specified conditions. Before the start of cycling, it is necessary to calibrate its reference capacity (to determine the value of denominator of the capacity retention rate) at the conditions of the temperature 25±2℃ and the current of 10A, determine the value of 0.5C current. The current needs to be re-calibrated in each 100 cycles, for re-determining the value of 0.5C current to adjust the current for subsequent

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cycling.

4.16. 25℃ 1C/1C 循环寿命 1C/1C Cycle Life at 25℃

在环境温度 25±2℃的条件下，以 1C 恒流充电至 3650mV，再恒压充电至电流 0.05C 截止；搁置 120min，然后以 1C 放电至 2500mV，放电结束后搁置 120min 后进行下一个循环，直至循环 2500 次。

循环开始前，需要在 25±2℃以 20A 标定其基准容量（计算容量保持率的分母），确定 1C 电流的值，且每 100 圈需要重新定容，重新确定 1C 电流的值，以校正后续循环的电流。

At the ambient temperature of 25±2℃, the cell undergoes the following cycling procedure repeatedly until completing 2500 cycles:

1. Charge at a constant current of 1C until reaching 3650mV.
2. Then, charge at a constant voltage until the current is no more than 0.05C.
3. Allow a 120-minute rest.
4. Discharge at a constant current of 1C until reaching 2500mV.
5. After the discharge, let it rest for 120 minutes before proceeding to the next cycle.

This cycle is repeated for a total of 3000 times under the specified conditions. Before the start of cycling, it is necessary to calibrate its reference capacity (to determine the value of denominator of the capacity retention rate) at the conditions of the temperature 25±2℃ and the current of 20A, determine the value of 1C current. The current needs to be re-calibrated in each 100 cycles, for re-determining the value of 1C current to adjust the current for subsequent cycling.

4.17. 安全与可靠性 Safety and Reliability Performance

以下测试参考 GB38031-2020, GB/T 36276-2018, UN38.3-2019 标准进行测试。

Tests below are carried out with reference to the standards of GB38031-2020, GB/T 36276-2018 and UN38.3-2019.

序号 No.	项目 Items	测试方法 Test Method
1	过放电 Over Discharge	GB 38031-2020
2	过充电 Over Charge	GB/T 36276-2018
3	外部短路 External Short Circuit	GB 38031-2020
4	加热 Heating	GB 38031-2020
5	跌落 Drop	GB/T 36276-2018
6	挤压 Crush	GB 38031-2020
7	低气压 Low Pressure	UN 38.3-2019

5. 电池安全操作限制 Safety Limits

5.1. 电压限制 Voltage Limits

项目 Items	类别 Category	数值 Value	备注 Remark
充电电压 Charging Voltage	一级 Primary-level	3.7 V	BMS 系统报警 BMS alarm
	二级 Secondary-level	3.75 V	降低电池充电电流或者功率 Reduce cell charge current or power
	三级 Three-level	3.80 V	切断电流，强制使电池停止工作 Cut off the current and force the cell to stop working
放电电压 Discharging Voltage	一级 Primary-level	2.0 V (T>0°C) 1.75 V (T≤0°C)	BMS alarm BMS 系统报警
	二级 Secondary-level	1.9 V (T>0°C) 1.70 V (T≤0°C)	降低电池放电电流或者功率 Reduce cell discharge current or power
	三级 Three-level	1.85 V (T>0°C) 1.65 V (T≤0°C)	切断电流，强制使电池停止工作 Cut off the current and force the cell to stop working
BMS 保护 BMS Protection	短路保护 Short-circuit protection	不允许短路 No short-circuit	发生短路时，过流器需要断开 As short-circuit occurs, the overcurrent need disconnects

备注:

(1) 提请甲方注意：当电池达到上述任何一项条款描述的指标和参数状态时，意味着电池已超出本协议规定的使用条件，甲方依据“备注”及本规格书其他相关规定对电池采取保护措施，同时，乙方声明对上述使用状态的电池质量不承担任何保证责任，并对因此而导致的甲方及第三方的任何损失不予赔偿。

(2) 应避免电池到达过放状态。甲方未按约定使用造成电池动态电压低于 1.85 V(T>0°C)、1.65 V(T≤0°C) 时，电池内部可能会遭到永久性的损坏，此时乙方的产品质量保证责任失效。当放电截止电压低于 2.5 V 时，系统内部能耗降到最小，并在重新充电之前延长休眠时间。甲方需要培训使用者在最短的时间内重新充电，防止电池进入过放状态。

(1) Customer's attention should be drawn to: When the cell reaches the indicators and parameter states described in any of the above clauses, it means that the cell has exceeded the conditions of use specified herein. Customer shall take protective measures for the cell in accordance with the "Remarks" and other relevant provisions of this Product Specification. Meanwhile, EVE declares that it shall not assume any guarantee responsibility for the quality of the cell in the above conditions of use. And shall not compensate Customer and any third party for any loss.

(2) Avoid over-discharge of the cell. If the cell's dynamic voltage is lower than 1.85V (T>0°C) or 1.65V (T≤0°C) due to Customer's failure to use the cell as agreed, the inside of the cell may be permanently damaged, in which case EVE's

product quality assurance liability becomes invalid. When the discharge cutoff voltage is lower than 2.5V, the internal energy consumption of the system is minimized and the sleep time is extended before recharging. Customer shall train the user to recharge the cell in the shortest possible time to prevent the cell from entering the over-discharge state.

5.2. 温度限制 Temperature Limits

项目 Items	数值 Value	备注 Remark
推荐操作温度范围 Recommended Operating Temperature Range	10℃~35℃	推荐使用电池的温度范围。 Recommended cell usage temperature range.
最高操作温度 Maximum operating temperature	60℃	如果电池使用温度超过操作温度范围，功率需要降为 0。 If the cell surface temperature exceeds the operating temperature range, the power needs to be reduced to 0.
最低操作温度 Minimum operating temperature	-20℃	
最高安全温度 Maximum safety temperature	60℃	如果电池使用温度超过最高安全温度或最低安全温度，将会造成电池不可逆的永久性损坏，用户使用时不得超过安全温度范围。 If the cell surface temperature exceeds the safety temperature range, it will cause irreversible and permanent damage to the cell. The user should not use it exceed the safety temperature range.
最低安全温度 Minimum safety temperature	-20℃	

(1) 电池避免在本技术协议禁止的低温条件下充电(包括但不限于标准充电，快充，紧急情况充电和再生充电等)，否则可能出现意外的容量降低现象。电池管理系统应依照最小的充电和再生充电温度进行控制。禁止在低于本规格书规定的温度条件下充电，否则，乙方不承担质量保证责任及由此引起的损失赔偿等一切相关责任。

(2) 电池包设计中应充分考虑电池的散热问题，由于电池包散热设计问题导致的电池或电池过热损坏，乙方不承担质量保证责任。

(1) The cell should avoid charging under low-temperature conditions prohibited by this technical agreement, including but not limited to standard charging, fast charging, emergency charging, and regenerative charging, as it may result in unexpected capacity reduction. The cell management system should control charging and regenerative charging based on the minimum specified temperature. Charging below the temperature specified in this Product Specification is prohibited. Otherwise, EVE does not assume quality assurance responsibility and any related liability for losses or damages caused.

(2) The design of the cell pack should give full consideration to the heat dissipation of the cell, and EVE shall not be responsible for the quality assurance of the cell or the cell overheating damage caused by the heat dissipation design of the cell pack.

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6. 电池操作说明及注意事项 Cell Operation Instruction and Precautions

6.1. 产品寿命终止管理 Product End-life Management

电池使用期限是有限的，客户应建立有效的跟踪系统监测并记录每个使用期限内电池的内阻和容量。内阻及容量的测量方法和计算方法需要客户和湖北亿纬动力有限公司共同讨论和双方同意。当使用中电池的内阻超过这个电池最初内阻的 150%或容量小于标称容量的 60% (25℃) 或与客户达成一致的电池寿命末期，应停止使用电池。违反该项要求，免除湖北亿纬动力有限公司依据产品销售协议以及本规格书所应承担的产品质量保证责任。

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 Power Co., Ltd. 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 60% of the nominal capacity (25°C) 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 Power Co., Ltd. from its responsibility for product quality assurance in accordance with the product sales agreement and this specification.

6.2. 长期存储 Long-term Storage

电池进行充电后，需尽快使用，以免因自放电而造成可用容量损失。若需要存储，则电池需要在干燥、通风、无腐蚀性气体影响的库房，低 SOC 态下进行存储。推荐的存储条件为: 30%~40%SOC, 0~25°C, ≤60%RH。

电池若在库房长期放置未使用，需定期进行补充电。电池补充电周期参考如下:

After charging the cell, it should be used as soon as possible to avoid loss of available capacity due to self discharge. If storage is required, the cell needs to be stored in a dry, ventilated, and non corrosive gas free warehouse under low SOC conditions. The recommended storage conditions are: 30%~40% SOC, 0-25 °C, ≤60% RH.

If the cell is not used for a long time in the warehouse, it need to be recharged periodically. The recharge cell cycle reference is as follows:

电池补充电周期 Cell Recharge Cycle		
实际存储温度 Actual Storage Temperature	补充电周期 Recharge Periodically	补充电方式 Recharge Method
0≤T≤25°C	6 个月 6 months	标准充放电1次后调整至存储SOC Cycle with standard charge and discharge current, then switch to storage SOC

备注: 对电池最后一次实际充放电日期或补电日期需进行记录

Note: Record the date of the last actual charge and discharge or recharge of the cell.

6.3. 运输 Transportation

产品的运输应在 30%~40% SOC 下包装成箱进行。在运输过程中应防止剧烈振动、冲击或挤压、避免日晒雨淋。适用于汽车、火车、轮船、飞机等交通工具运输。

Cell for shipping should be packed in boxes with the SOC of 30%~40%. The severe vibration, impact, extrusion, sun and rain should be prevented during shipping. Applicable methods of transportation include truck, train, ship, airplane, etc.

6.4. 操作说明 Operation Precautions

- 禁止反向充电。正确连接电池的正负极，严禁反向充电。
- 禁止过放电。在电池正常使用过程中，为防止过放电，电池应定期充电，将电压维持在 2.5 V 以上。
- 严禁将电池浸入水中，保存不用时，应放置于阴凉干燥的环境中。
- 禁止将电池放在热高温源旁边，如火、加热器等使用和留置。
- 充电时请选用锂离子电池专用充电器。
- 在使用过程中，严禁将电池正负极颠倒。
- 禁止将电池丢于火或给电池加热。
- 禁止用金属直接导通电池正负极。
- 禁止将电池与金属，如发夹、项链等一起运输或贮存。
- 禁止敲击或抛掷、踩踏和弯折电池等。
- 禁止直接焊接电池。
- 禁止用钉子或其它利器刺穿电池。
- 不要使用处于极热环境中的电池，如阳光直射或热天的车内。
- 禁止在强静电和强磁场的地方使用。
- 如果电池漏液，电解液溅入到皮肤、眼睛、口、鼻等部位，应立即用大量清水冲洗，并马上送医治疗，否则会对人体造成严重伤害。
- 如果电池出现异味、发热、变色、变形或使用、贮存、充电过程中出现任何异常时不得使用。
- 套标（即蓝膜）均起绝缘保护作用。为确保安全，电芯需要带套标使用。在无套标、有所缺失的状态下使用电芯从而导致的问题，EVE 不承担售后与质保责任。
- It is forbidden to inversely charge. Correctly connect the positive and negative poles of the cell, and reverse charging is strictly prohibited.
- It is forbidden to over-discharge. During the normal use of the cell, in order to prevent over-discharge, the cell should be charged regularly to maintain the voltage above 2.5 V.
- 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.
- It is forbidden to use and leave the cell next to heat and high temperature sources, such as fire, heater, etc.

- Please use a special charger for lithium-ion batteries when charging.
- During usage, it is strictly prohibited to reverse the positive and negative terminals of the cell.
- Do not throw the cell in the fire or heater.
- It is forbidden to use metal to directly connect the positive and negative terminals of the cell to short-circuit.
- It is forbidden to transport or store the cell with metal, such as hairpins, necklaces, etc.
- It is forbidden to knock or throw, step on, or bend the cell.
- It is forbidden to directly solder the cell.
- It is forbidden to directly pierce the cell with nails or other sharp objects.
- It is forbidden to use or place the cell under high temperature (under hot sunlight), such as in a car under direct sunlight or in a hot day.
- It is forbidden to use it in places with strong static electricity and strong magnetic fields.
- If the cell leaks and the electrolyte splashes on the skin, clothes, eyes, mouth, nose, etc., immediately wash the affected area with running water and send to a doctor for treatment immediately, otherwise it will cause serious harm to the human body.
- If the cell emits peculiar smell, heat, discoloration, deformation, or any abnormality during use, storage, or charging, stop using it.
- The sleeve—the blue film,that encapsulate the cell both provide insulation protection. For safety, the cell must be used with the sleeve. EVE Power Co., Ltd. does not assume any after-sales service or warranty responsibility for problems caused by using the cell without the sleeve, and does not assume any after-sales service or warranty responsibility for problems caused by using the cell with the damaged sleeve or the damaged.

6.5. 免责声明 Disclaimer

如果由于产品需求单位不按本说明书中的规定进行使用，造成社会性影响，并对湖北亿纬动力有限公司的声誉造成影响的，湖北亿纬动力有限公司将会追究产品需求单位的责任。根据对湖北亿纬动力有限公司造成的影响程度，产品需求单位需向湖北亿纬动力有限公司提供赔偿。

If the product demanding party does not use the provisions in this manual, which causes social impact and affects the reputation of EVE Power Co., Ltd., EVE Power will pursue the responsibility of the product demanding party. According to the degree of impact on EVE Power, the product demand party must provide compensation to EVE Power.

7. 其它 Other

本规格书受中华人民共和国法律管辖，但不包括其冲突规范。因本规格书或者履行过程引发的争议应由双方友好协商解决，协商不成，任何一方均可向湖北亿纬动力有限公司所在地人民法院提起诉讼。

本规格书为中英互译版本，如中文与英文约定内容有歧义，以中文内容为准。

本规格书自双方签字盖章之日起生效。一式两份，具有同等法律效力。

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本规格书未尽事宜，由双方另行签订补充协议，补充协议与本规格书具有同等法律效力。非经双方签署书面的文件，本规格书的任何条款不得被修改或者变更。

These specifications shall be governed by the laws of the People's Republic of China, excluding its conflict specifications. 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.

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.

This specification shall come into force upon being signed and sealed by both parties. In duplicate, both copies shall have the same legal effect.

For matters not covered in this specification, both parties shall separately sign a supplementary agreement which shall have the same legal effect as this specification document. No provision of this specification shall be modified or altered without a written document signed by both parties.

8. 联系方式 Contact Information

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产品名称 Product	C40KS-V2.1	文件编号 Specification No.	PBRI-C40KS-V2.1-D06-03	版本 Version	A

附录 A　Appendix A: Cell Dimension Diagram　电芯尺寸图

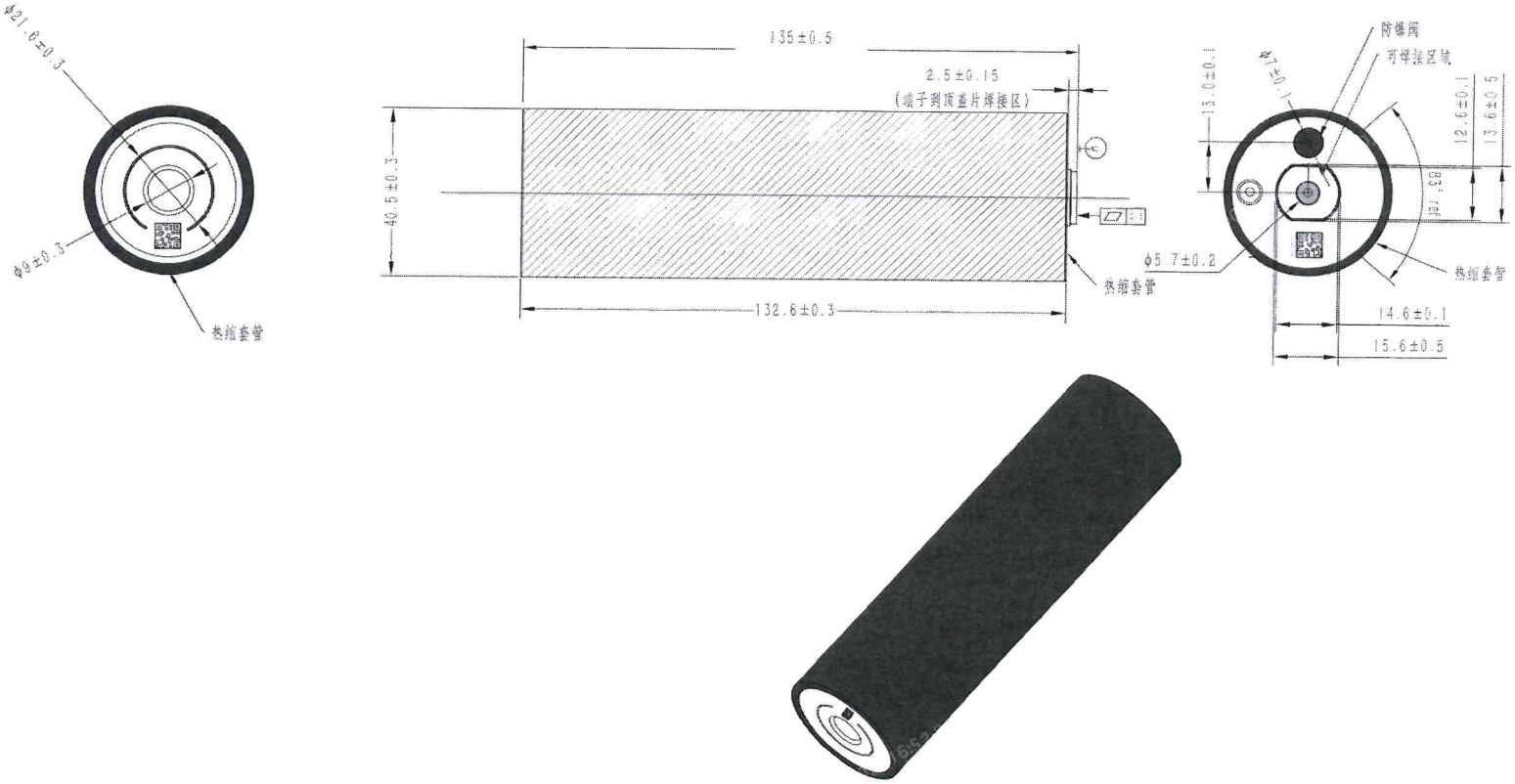


图3　电芯尺寸图 Cell Dimension Diagram