



Model 型号	IFR33140	Spec No. 规格书编号	PBRI-C33-V2-D06-02	Version NO. 版本	A
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SPECIFICATION OF PRODUCT

产品交付规格书

型号 (Model) : IFR33140

Designed 设计制作	Designer Checked 产品设计审核	QC Checked 品质审核	Sales Checked 销售审核	Approved 批准

Customer Signature 客户接收栏
公司名称 (Company name) :
批 准 (Approved by) :
日 期 (Signature Date) :

2022 年 11 月

EVE Power CO., LTD
湖北亿纬动力有限公司



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客户要求 (Customer Request)

NO. 序号	Special Requirements 特殊要求	Specification 标准
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2		
3		
4		
5		

客户代码 (Customer Code) : _____

签 字 (Signature) : _____

日 期 (Date) : _____



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Revision History

变更履历

Revision NO. 版本	Date 日期	Description 更改内容	Author 确认人
A	2022.11.15	First Edition 新版发行	王二峰

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术语定义 (Definition of Terms)

Terms 术语	Definition 定义
Product 产品	"Product" in this specification refers to 15 Ah rechargeable cylindrical lithium ion battery produced by EVE Power Co., Ltd. 本规格书中的“产品”是指湖北亿纬动力有限公司生产的 15Ah 可充电圆柱锂离子电池。
customer 客户	Refers to the buyer in the product sales contract of EVE Power Co., Ltd. 指《湖北亿纬动力有限公司产品销售合同》中的买方。
Rate 倍率 (C)	The ratio of the charge/discharge current to the rated capacity value. For example, the battery capacity is 15Ah, when the charging or discharging current is 15A, the charging or discharging rate is 0.33C. 充/放电电流与电池的额定容量值的比率。例如，电池容量为 15Ah，当充电或放电电流为 15A 时，则充电或放电倍率为 0.33C。
State of charge 荷电状态 (SOC)	Under no-load conditions, the ratio of the battery capacity state to the rated capacity measured in Ah or Wh. For example, if the capacity is 15Ah as 100% SOC, when the capacity is 0Ah, the SOC is 0%. 在无负载的情况下，以安培小时或者以瓦特小时为单位计量的电池容量状态与额定容量的比值。如：若将容量为 15Ah 的状态视为 100%SOC，则容量为 0Ah 时，SOC 为 0%。
Standard charging 标准充电	The charging mode described in Article 3.3 of this specification. 本规格书第 3.3 条所述的充电模式。
Standard discharging 标准放电	The discharging mode described in Article 3.4 of this specification. 本规格书第 3.4 条所述的放电模式。
DC Resistance 直流电阻 (DCR)	The ratio of the voltage changes of the battery to the corresponding current change under working conditions. 工作条件下电池的电压变化与相应的电流变化之比。
Units 测量单位	“V” (Volt) 伏特(V)，电压单位 “A” (Ampere) 安培(A)，电流单位 “Ah” (Ampere-Hour) 安培-小时(Ah)，负荷单位 “Wh” (Watt-Hour) 瓦特-小时(Wh)，能量单位 “mΩ”(MilliOhm) 毫欧姆(mΩ)，电阻单位 “°C”(degree Celsius) 摄氏度 (°C)，温度单位 “mm”(millimeter) 毫米 (mm)，长度单位 “s”(second) 秒 (s)，时间单位 “Hz” (Hertz) 赫兹(Hz)，频率单位

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1. 基本信息 (Basic Information)

1.1. 适用范围 (Scope)

This product specification has been prepared to specify the cylindrical rechargeable lithium-ion cell to be supplied to customer by EVE Power Co., Ltd.

本产品规格书适用于由湖北亿纬动力有限公司生产的圆柱锂离子电池。

1.2. 产品类型 (Description)

Cylindrical Lithium-ion Rechargeable cell.

圆柱锂离子可充电电芯。

1.3. 产品型号 (Model Name)

EVE—I F R 33 140

① ②③ ④⑤ ⑥

- ① The letter "EVE" defines EVE Power Co., LTD.

"EVE"代表湖北亿纬动力有限公司。

- ② The letter "I" defines Lithium-ion cell.

"I"代表锂离子电池。

- ③ The letter "F" defines LFP.

"F"代表磷酸铁锂。

- ④ The letter "R" defines Rotundity.

"R"代表圆柱形。

- ⑤ The letter "333" defines the diameter of the cell.

"33"代表电芯直径为 33 mm。

- ⑥ The letter "140" defines the height of the cell.

"140"代表电芯高度为 140 mm

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2. 电池规格参数 (Specification Parameters)

2.1. 电池基本参数 (Basic Parameters)

Item 项目	Specification 标准		Remarks 备注
Average capacity@3.65~2.5V 均值容量@3.65~2.5V	15500	mAh	0.33C discharge 0.33C放电
Minimum capacity@3.65~2.5V 最小容量@3.65~2.5V	15000	mAh	0.33C discharge 0.33C放电
AC-IR 交流内阻	≤3	mΩ	AC 1 kHz@25°C 30%SOC
DC-IR 直流内阻	≤8	mΩ	2C放电30s@25°C 30%SOC
Recommended SOC range 推荐SOC窗口	0-100	%	2.5V~3.65V(0.5C)
End-of-charge Voltage 充电限制电压	3.65	V	
End-of-charge Current 充电截止电流	750	mA	0.05C
End-of-discharge Voltage 放电截止电压	T>0°C@2.5 T≤0°C@2.0	V	
Nominal Voltage 额定电压	3.2	V	
Standard Charging current 标准充电电流	7500	mA	0.5C
Max Charge current 最大充电电流	30000	mA	2C 10s
Standard Discharge current 标准放电电流	15000	mA	1.0C
Max Discharge current 最大放电电流	45000	mA	3C 10s

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Operating Temperature Range 操作温度范围	Charging Temp. 充电温度		0~55℃		
	Discharging Temp. 放电温度		-20~60℃		
	Storage Humidity 存储湿度		≤70% RH		
Monthly self-discharge rate 月自放电率	≤3.0		%/month	25℃, shipment state, new battery storage after 3 months 25℃ 出货态, 新电池存储3个月后	

2.2. 产品规格 (Product Specification)

2.2.1. 尺寸、重量指标 (Dimension and Weight)

NO. 序号	Item 项目	Specification 标准	Test Method Chapter 测试方法章节
1	Cell Dimension 电芯尺寸	Diameter: $\Phi 33.3 \pm 0.2$ mm (coated) 直径: $\Phi 33.3 \pm 0.2$ mm (包膜)	3.5.1.
		Height : 141.0 ± 0.5 mm (pole contained) 总高: 141.0 ± 0.5 mm (含极柱)	3.5.1
		Shoulder Height : 136.36 ± 0.25 mm (pole not contained) 肩高: 136.36 ± 0.25 mm (不含极柱)	3.5.1.
2	Cell Weight 重量	267 $\pm$ 6g	3.5.2.

2.2.2. 电性能指标 (Electrical Performance)

NO. 序号	Test Item 测试项目		Specification 标准	Test Method Chapter 测试方法章节
1	Capacity 容量	0.33C discharge 0.33C 放电	≥15000mAh	3.5.4.1
2	Temperature Dependence of Discharge Capacity (1.0C discharge) 不同温度放电性能 (1.0C 放电)	-20℃ Retention Ratio -20℃容量保持率	≥70%	3.5.4.2.
3		-10℃ Retention Ratio -10℃容量保持率	≥80%	3.5.4.2.
4		0℃ Retention Ratio 0℃容量保持率	≥85%	3.5.4.2.

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5		25°C Retention Ratio 25°C容量保持率	100%	3.5.4.2..	
6		45°C Retention Ratio 45°C容量保持率	≥95%	3.5.4.2.	
7		60°C Retention Ratio 60°C容量保持率	≥95%	3.5.4.2..	
8	100% SOC Temperature Charge Retention and Regain 100% SOC 荷电保 持与恢复能力	28d, 25°C	Retention Ratio≥96% Recovery Ratio≥97% 容量保持率≥96%，容量恢复 率≥97%	3.5.4.3.	
9		28d, 45°C	Retention Ratio≥90% Recovery Ratio≥95% 容量保持率≥90%，容量恢复 率 95%	3.5.4.3.	
10		25°C 100%DOD Cycle Life 25°C 100%DOD 循环寿命	After 2000 cycles, Capacity retention≥80% Initial capacity 2000 周后容量保持率≥80%	3.5.4.4.	
11		45°C 100%DOD Cycle Life 45°C 100%DOD 循环寿命	After 1000 cycles, Capacity retention≥70% Initial capacity 1000 周后容量保持率≥70% 初始容量	3.5.4.5	

2.2.3. 安全性能指标 (Safety Performance)

NO. 序号	Test Item 测试项目	Specification 标准	Test Method Chapter 测试方法章节
1	Over-charge Test 过充电测试	No explosion, no fire 不爆炸、不起火	3.5.4.1.
2	Over-discharge Test 过放电测试	No explosion, no fire 不爆炸、不起火	3.5.4.2.
3	Short-circuit Test 短路测试	No explosion, no fire 不爆炸、不起火	3.5.4.3.
4	Crush Test 挤压测试	No explosion, no fire 不爆炸、不起火	3.5.4.4.
5	Heating Test 加热测试	No explosion, no fire 不爆炸、不起火	3.5.4.5.
6	Temperature cycling test 温度循环	No explosion, no fire 不爆炸、不起火	3.5.4.6.

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2.3. 电池图纸 (Outline Dimensions)

See the attachment (Fig. A).

见附录图一。

2.4. 外观 (Appearance)

There shall be no such defects as rust, discoloration, leakage which may adversely affect commercial value of the cell.

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。

3. 试验条件 (Standard Test Condition)

3.1. 环境条件 (Environment Condition)

Unless otherwise specified, all tests stated in this Product Specification should be conducted at temperature $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and humidity $65\% \pm 20\% \text{ RH}$.

若无特别要求，此规格书上的产品测试条件均为温度： $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ ；湿度： $65\% \pm 20\% \text{ RH}$ 。

3.2. 测量设备 (Measuring Equipment)

The accuracy of measuring instruments and meters should meet the following requirements:

测量仪器、仪表准确度应满足以下要求：

- (1) 电压测量装置 (Volt measuring Equipment)： $\pm 0.1\%$ ；
- (2) 电流测量装置 (Amp measuring Equipment)： $\pm 0.1\%$ ；
- (3) 温度测量装置 (Temp measuring Equipment)： $\pm 0.5^{\circ}\text{C}$ ；
- (4) 尺寸测量装置 (Dimension measuring Equipment)： $\pm 0.01\text{mm}$ ；
- (5) 重量测量装置 (Weight measuring Equipment)： $\pm 0.1\text{g}$ 。

3.3. 标准充电方式 (Standard Charge Method)

The "Standard Charge" means charging the cell at a constant current of 0.5C until the voltage is 3.65V , then charge at a constant voltage of 3.65V until its current is less than 0.05C . For test purpose, charging shall be performed at $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Unless otherwise specified, it indicates "Standard Charge".

“标准充电”即在环境温度为 $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ 的条件下，先以恒定电流 0.5C 充电至 3.65V ，再以 3.65V 的恒压充电至电流小于 0.05C 。若无特别说明，此规格书充电方式表示“标准充电”。

3.4. 标准放电方式 (Standard Discharge Method)

The "Standard Discharge" means discharging the cell at a constant current of 1.0C until the voltage is 2.5V . For test purpose, discharging shall be performed at $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Unless otherwise specified, it indicates "Standard Discharge".

“标准放电”即在环境温度为 $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ 的条件下，以恒定电流 1.0C 放电到 2.5V 。若无特别说明，此规格书放电方式表示“标准放电”。

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3.5. 测试方法 (Test Method)

3.5.1. 尺寸 (Dimension)

Use a caliper to measure the diameter and height of the cell.

使用卡尺测量电芯直径和高度。

3.5.2. 重量 (Weight)

Use an electronic scale to measure the weight of the battery.

使用电子秤测量电池的重量。

3.5.3. 内阻 (Internal Resistance)

ACR: At $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, when the SOC is 30 % at ambient temperature, test the cell with a frequency of AC 1kHz.

DCR: At $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, the cell is discharged to 2.0 V with a current of 0.5C. Rest for 30 min, and charge with constant current of 0.5C for 36 min (adjust the SOC to 30 %). Then rest for 30 min, and record the voltage V_1 at the end of the period. Put a 30 s discharge pulse current of 2 C and record the voltage V_2 at the end of the pulse, and calculate the $\text{DCR} = (V_1 - V_2) \times 1000 / 30 \text{ (m}\Omega\text{)}$.

ACR: 在环境温度 $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ 的条件下, 30%SOC 的电芯采用 1kHz 的频率进行测试。

DCR: 在环境温度 $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ 的条件下, 电芯以 0.5C 放电至 2.0V, 搁置 30min 后使用 0.5C 的电流充电 36min (调整 SOC 至 30%), 搁置 30min, 记录搁置末期电压 V_1 , 用 2C 的电流放电 30s, 记录放电末端电压 V_2 , 计算 $\text{DCR} = (V_1 - V_2) \times 1000 / 30 \text{ (m}\Omega\text{)}$ 。

3.5.4. 电性能 (Electrical Characteristics)

3.5.4.1. 放电容量 (Discharge Capacity)

0.33C discharge capacity: At $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, the cell is charged to 3.65 V with constant current of 0.5 C, then charge at constant voltage of 3.65V until decreases to 0.05 C, and rest for 30 minutes; Discharge at a constant current of 0.33 C to a cutoff of 2.5 V and record the discharge capacity. Cycle 5 times and record the average discharge capacity of the last three times.

0.33C 放电容量: 在环境温度 $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, 0.5 C 恒流恒压充电至 3.65 V, 0.05 C 截止, 搁置 30 min; 0.33 C 恒流放电至 2.5 V 截止, 搁置 30 min; 循环 5 次, 记录后三次放电容量均值。

3.5.4.2. 不同温度放电性能 (Temperature Dependence of Discharge Capacity)

Capacity calibration: At $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, the cell is charged to 3.65 V with constant current of 0.5 C, then charge at constant voltage of 3.65V until decreases to 0.05 C, and rest for 30 minutes; Discharge at a constant current of 1 C to a cutoff of 2.5 V and record the discharge capacity. Then, the cell is fully charged according to the standard charging method at $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

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Low temperature discharge: Rest at $-20/-10/0 \pm 2$ °C for 12 hours, and then discharge at 1C to 2.0V at $-20/-10/0 \pm 2$ °C. Record the discharge capacity, and the capacity retention = the specific temperature discharge capacity/calibration capacity.

High temperature discharge: Rest at $45/60 \pm 2$ °C for 6 hours, then discharge at 1C at $45/60 \pm 2$ °C to 2.5V, record the discharge capacity, and the capacity retention = the specific temperature discharge capacity/calibration capacity.

容量标定：在环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 下对电池进行 1C 放电至 2.5V 进行容量标定，记录标定容量。然后在 $25^{\circ}\text{C} \pm 2$ 使用标准充电方式对电芯充满电。

低温放电：在 $-20/-10/0 \pm 2^{\circ}\text{C}$ 下搁置 12h，再在此温度下 1C 放电至 2.0V，记录放电容量，容量保持率=放电容量/标定容量。

高温放电：在 $45/60 \pm 2^{\circ}\text{C}$ 下搁置 6h，再在此温度下 1C 放电至 2.5V，记录放电容量，容量保持率=放电容量/标定容量。

3.5.4.3. 100% SOC 荷电保持与恢复能力 (100% SOC Temperature Charge Retention and Regain)

Capacity calibration is carried out according to standard charging and discharging method, recording the discharge capacity C_0 ; Then, the cell is fully charged according to the standard charging method. After that, rest the cell at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ / $45^{\circ}\text{C} \pm 2^{\circ}\text{C}$ / $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 28D, and discharge it to 2.5V with constant current of 0.5 C under the environment of $25^{\circ}\text{C} \pm 2$ °C. The discharge capacity is recorded as discharge retention capacity. Then, cycling three times according to the standard charging and discharging method (record the third time as the discharge recovery capacity). Capacity retention rate=discharge retention capacity/calibration capacity $\times 100\%$, capacity recovery rate =discharge recovery capacity/calibration capacity $\times 100\%$.

电池先按照标准充放电方式进行标定容量测试，而后电池按照标准充放电充满电，在环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ / $45^{\circ}\text{C} \pm 2^{\circ}\text{C}$ / $60^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的条件下搁置 28 天，然后在环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的条件下按照标准放电制度放电至 2.5 V（记录放电保持容量），搁置 30 min，然后按照标准充放电制度循环三次（记录第三次为放电恢复容量）。容量保持率=放电保持容量/标定容量 $\times 100\%$ ，容量恢复率=放电恢复容量/标定容量 $\times 100\%$ 。

3.5.4.4. 25°C 100% DOD 循环寿命 (25°C 100%DOD Cycle Life)

At ambient temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, Charge the cell to 3.65 V with constant current of 0.5 C, then switching to constant voltage charging to 0.05 C to cut off, and rest for 30 min. Discharge to 2.5 V with constant current of 1.0 C and rest for 30 min. Repeat charge and discharge and cycle 2000times.

在环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的条件下，以 0.5 C 恒流充电至 3.65 V，再恒压充电至电流 0.05 C 截止；搁置 30 min，然后以 1.0 C 放电至 2.5 V，放电结束后搁置 30 min 后进行下一个循环，直至循环 2000 次。

3.5.4.5. 45°C 100% DOD 循环寿命 (45°C 100%DOD Cycle Life)

At ambient temperature of $45^{\circ}\text{C} \pm 2^{\circ}\text{C}$, Charge the cell to 3.65 V with constant current of 0.5 C, then switching to constant voltage charging to 0.05 C to cut off, and rest for 30 min. Discharge to 2.5 V with constant current of 1.0 C and rest for 30 min. Repeat charge and discharge and cycle 1000times.

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在环境温度 $45^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 的条件下，以 0.5 C 恒流充电至 3.65 V，再恒压充电至电流 0.05 C 截止；搁置 30 min，然后以 1.0 C 放电至 2.5 V，放电结束后搁置 30 min 后进行下一个循环，直至循环 1000 次。

3.5.5. 安全性能 (Safety Test)

All below tests are carried out on the equipment with forced ventilation and explosion-proof device. Before test, all cells should be charged in accordance with 3.3.

下述试验应在有强制排风条件及防爆措施的装置内进行，在试验前所有的电芯都按 3.3 规定标准充电方式充电后再进行以下试验。

3.5.5.1. 过充电测试 (Over-charge Test)

At ambient temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, after the cell is charged to 1.5 times the termination voltage, or 1 charging time reaching 1.0h, stop charging. Observe for 1 h.

测试环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，以 1 C 电流恒流充电至电池电压达到 1.5 倍充电终止电压或充电 1h 后停止充电。完成以上试验步骤后，在试验环境温度下观察 1 h。

3.5.5.2. 过放电 (Over-discharge Test)

At ambient temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, the cell is discharged with constant current of 1 C for 90 min. Observe for 1 h.

测试环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，以 1 C 电流恒流放电 90 min；完成以上试验步骤后，在试验环境温度下观察 1 h。

3.5.5.3. 短路测试 (Short-circuit Test)

At ambient temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, the anode and cathode terminals of the cell are short-circuited externally for 10 min, and the resistance of the external circuit should be less than $5\text{m}\Omega$. Observe for 1 h.

测试环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，将电池正负极经外部短路 10 min，外部线路电阻应小于 $5\text{m}\Omega$ 。完成以上试验步骤后，在试验环境温度下观察 1 h。

3.5.5.4. 挤压测试 (Crush Test)

At ambient temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, A cell is to be crushed between two flat surfaces. The force for the crushing is to be applied by a hydraulic ram or similar force mechanism:

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

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

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

d) Extrusion degree: stop extruding after the voltage reaches 0V or the deformation reaches 15 % or the extruding

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force reaches 100kN or 1000 times the weight of the test object;

e) Keep it for 10 min. Observe for 1h.

测试环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，将电芯置于挤压设备的两个挤压平面之间，用液压油缸或类似的力挤压按照下列条件进行试验：

a) 挤压板: 半径 75 mm 半圆柱体，长度超过电池尺寸；

b) 挤压方向: 垂直于蓄电池极板方向施压；

c) 挤压速度: 不大于 2 mm/s；

d) 挤压程度: 电压达到 0 V 或变形量达到 15% 或挤压力达到 100 kN 或 1000 倍试验对象重量后停止挤压；

e) 保持 10min，观察 1h。

3.5.5.5. 加热测试 (Heating Test)

At ambient temperature of $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$, a cell is to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of $5^{\circ}\text{C} \pm 2^{\circ}\text{C}/\text{min}$ to a temperature of $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and remain for 30 min and observed 1h.

测试环境温度 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ，将电芯放在电热鼓风干燥箱中加热，温度以 $5^{\circ}\text{C} \pm 2^{\circ}\text{C} / \text{min}$ 的速率由室温升至 $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 并保持 30min。完成以上试验步骤后，在试验环境温度下观察 1 h。

3.5.5.6. 温度循环测试 (Temperature cycling test)

Put the cell in a low temperature box of $-40 \pm 2^{\circ}\text{C}$ for 1h and keep it for 90min, then put it in a high temperature box of $85 \pm 2^{\circ}\text{C}$ for 90min and keep it for 300min, take it out and place it at $25 \pm 2^{\circ}\text{C}$ for 70min, repeat the above operation 5 times and observe 1h.

将电芯放入 $-40 \pm 2^{\circ}\text{C}$ 的低温箱调节 1h, 保持 90min, 然后将其放入 $85 \pm 2^{\circ}\text{C}$ 的高温箱调节 90min, 保持 300min, 取出后在 $25 \pm 2^{\circ}\text{C}$ 放置 70min, 重复上述操作 5 次, 观察 1h。

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

4.1. 储存建议 (Storage Recommendations)

4.1.1. 短期存放 (Short Period Storage)

* Storage the cell at temperature of $0^{\circ}\text{C} \sim 45^{\circ}\text{C}$ (less than 3 months), low humidity and no corrosive gas atmosphere.

电芯短期存放 (不超过 3 个月) 应储存在 $0^{\circ}\text{C} \sim 45^{\circ}\text{C}$ 温度范围, 低湿度和不含腐蚀性气体的环境中。

* No press on the cell

不要让电芯承受任何压力。

4.1.2. 长期存放 (Long Period Storage)

* In case of long period storage (more than 3 months), storage the cell at temperature range of $0^{\circ}\text{C} \sim 25^{\circ}\text{C}$, low humidity, no corrosive gas atmosphere.

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电芯长期存放（超过 3 个月）应存储在 0℃~25℃ 温度范围，低湿度和不含腐蚀性气体的环境中。

- * No press on the cell.
不要让电芯承受任何压力。

4.2. 运输 (Shipment)

The capacity of delivery cell is approximately at 30% of charging. It is not specified more than 30% capacity remain at customer, because of self-discharge. During transportation, keep the cell from acutely vibration, impacting, solarization, drenching.

出货电芯为 30%SOC 状态，由于电芯存在自耗，运送到客户端的电芯无法完全保证 30%荷电量。运输过程应防止剧烈振动、冲击、日晒雨淋。

4.3. 操作说明 (Operation Instruction)

4.3.1. 充电 (Charging)

- * Charge the cell in an ambient temperature range of 0℃ to 55℃.
电芯充电环境温度范围为 0℃~55℃。
- * Charge the cell at a constant current of 7500mA until 3.65V is attained. Charge rates greater than 15000mA are not recommended.

建议以 7500mA 的电流恒流充电至 3.65V，超过 15000mA 的电流建议不要使用。

4.3.2. 放电 (Discharging)

- * Recommended cut-off voltage to 2.5V for temperature above 0℃ and 2.0V for temperature below 0℃. Discharge rates greater than 45000mA are not recommended.

建议温度在 0℃以上的放电终止电压为 2.5V，0℃以下的放电终止电压为 2.0V，超过 45000mA 的电流建议不要使用。

- * For maximum performance, discharge the cell in an ambient temperature range of -20℃ to 60℃.
为了达到较好的性能，电芯的放电环境温度范围为-20℃~60℃。

4.3.3. 电芯防范措施 (Standard Cell Precaution)

- * Do not expose the cell to extreme heat or flame.
不要将电芯暴露在极热或有火星的环境中。
- * Do not short circuit, over-charge or over-discharge the cell.
不要将电芯短路，过充或过放。
- * Do not subject the cell to strong mechanical shocks.
不要使电芯承受过重的机械冲击。
- * Do not immerse the cell in water or sea water, or get it wet.
不要将电芯浸入海水或水中，或者使其吸湿。
- * Do not reverse the polarity of the cell for any reason.

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不要颠倒电芯的正负极。

- * Do not disassemble or modify the cell.
不要拆卸或修整电芯。
- * Do not handle or store with metallic like necklaces, coins or hairpins, etc.
不要和项链,硬币或发夹等金属物品放置在一起。
- * Do not use the cell with conspicuous damage or deformation.
不要使电芯受到明显的损害或变形。
- * Do not connect cell to the plug socket or car-cigarette-plug.
不要将电芯与插座连接。
- * Do not make the direct soldering onto a cell.
不要直接焊接电芯。
- * Do not touch a leaked cell directly.
不要直接接触泄漏的电芯。
- * Do not use for other equipment.
不要将电芯用于其它设备。
- * Do not use Lithium-ion cell in mixture.
不要将锂离子电芯混合使用。
- * Do not use or leave the cell under the blazing sun (or in heated car by sunshine).
不要将电芯放置在太阳光直射的地方。
- * Keep cell away from children.
将电芯放置在远离儿童的地方。
- * Do not drive a nail into the cell, strike it by hammer or tread it.
不要针刺、锤打或践踏电芯。
- * Do not give cell impact or fling it.
不要撞击或投掷电芯。

4.4.其他 (Others)

For the sake of safety assurance, if there are equipment design, lithium ion cell system protection circuit, fast charging and other special application, please consult EVE first. Any matters not mentioned in this specification must be negotiated and determined by both parties.

为了安全起见,如有设备设计,锂离子电池系统保护电路或高电流,快速充电和其它方面的特殊应用,请先咨询亿纬公司相关事宜。任何本规格书中未提及的事项,须经过双方协商确定。

This specification is written in both Chinese and English. In case of any conflict between the English version and the Chinese version, the Chinese version shall prevail.

本规格书由中英两种语言书写,当英文版本和中文版本发生冲突时,以中文版本为主。

5. 免责声明 (Disclaimer)

If the product demand unit or user does not use the product in accordance with the provisions of this manual, EVE will no longer bear all relevant responsibilities such as product quality assurance liability and loss compensation caused

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thereby. In case of any negative impact on EVE's reputation due to the above-mentioned acts, EVE reserves the right to investigate the legal liability of the product demand unit.

如果由于产品需求单位和使用者的不按本说明书中的规定进行使用，EVE 不再承担产品质量保证责任及由此引发的损失赔偿等一切相关责任。因前述行为，对 EVE 的声誉造成负面影响的，EVE 将保留追究产品需求单位法律责任权利。

6. 联系方式（Consultation）

As to the obscurity, contact the following:

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

Email: sales@evebattery.com

Website: <http://www.evepower.com>

如有疑问，请按以下方式咨询：

地址：中国 湖北省荆门市高新区 掇刀区荆南大道 68 号，湖北亿纬动力有限公司

联系邮箱：sales@evebattery.com

网 址：<http://www.evepower.com>

附图一：IFR33140 图纸（Attachment I: IFR33140 drawing）

A cell is made of cathode pole piece, anode pole piece, diaphragm, aluminum shell, positive plate and negative plate etc, the full-size cell size is shown in Figure A.

电芯由正极极片、负极极片、隔膜、铝壳、正极盖板和负极盖板等组成，全尺寸（包膜）电芯尺寸如图 A 所示。

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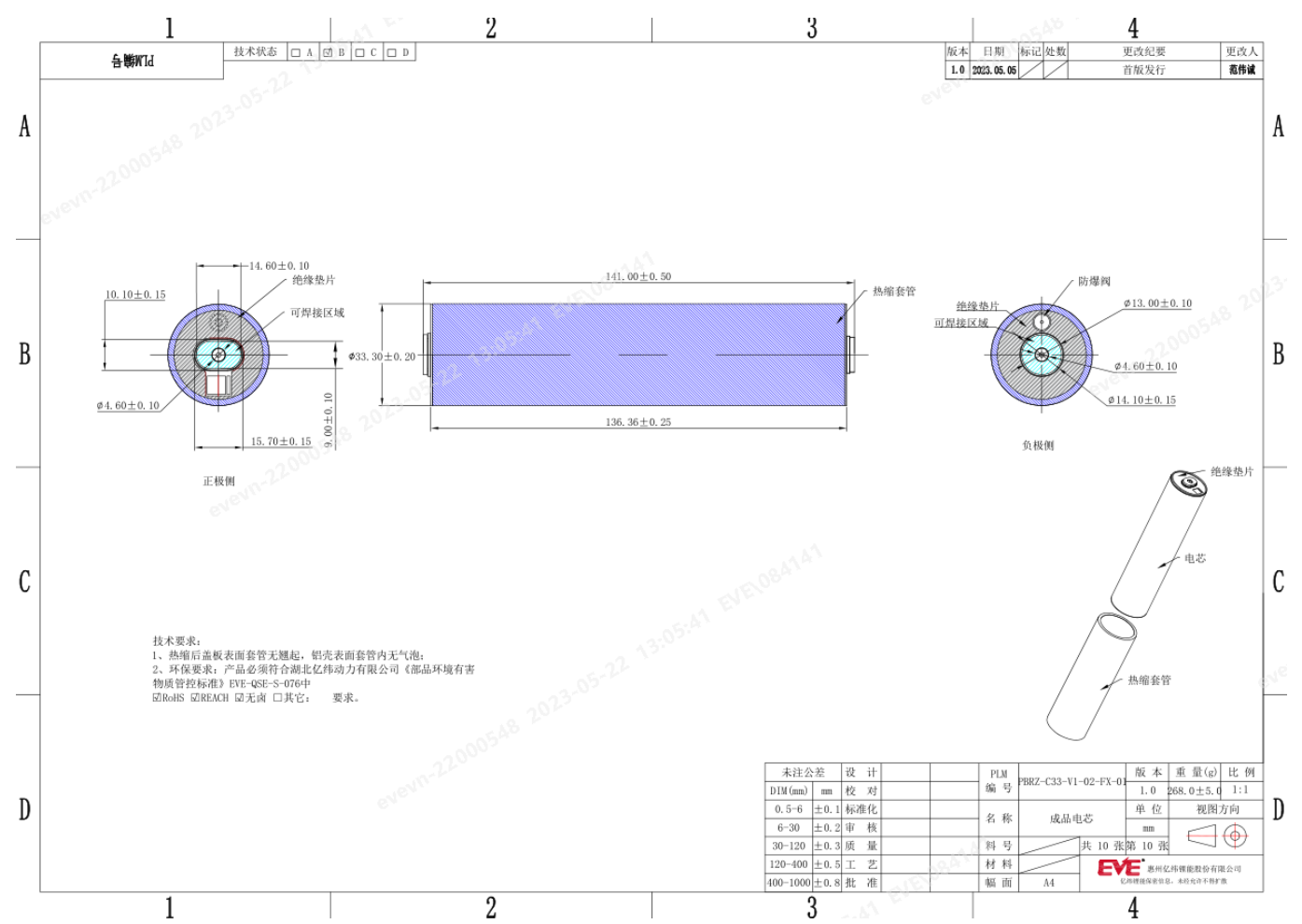


Figure A (图 A)