产品规格书

Product Specification

产品型号/ Product No.：PF300-166A

制定/Producer	审核/Checker	批准/Approver

目　录 Content

前　言 Preview

本标准为公司统一执行的企业标准。

本标准的编写格式符合 GB/T 1.1-2009《标准化工作导则 第 1 部分：标准的结构和编写》的规定。

本标准在参照 GB/T 31486-2015 《电动汽车用动力蓄电池电性能要求及试验方法》、GB/T 31484-2015 《电动汽车用动力蓄电池循环寿命要求及试验方法》和 GB 38031-2020《电动汽车用动力蓄电池安全要求》的基础上，结合我公司产品实际和试验条件进行制定，并对试验方法、判定标准内容进行了修订和补充，以指导 PF300-166A 锂离子电芯产品的制造和验收。

This file defines the detail specifications (e.g. performance and diameter) of the rechargeable Lithium-ion cell (PF300-168A), manufactured by the enterprise.

Based on national standards: GB/T 31486-2015 (Electrical performance requirements and test methods for traction battery of electric vehicle), GB/T 31484-2015 (Cycle life requirements and test methods for traction battery of electric vehicle), GB 38031-2020 (Electric vehicle traction battery safety requirements) and combined with the company's actual product & testing environment, this file is issued to guide the production and acceptance of rechargeable Lithium-ion cell - PF300-166A.

修订记录 Revision record

版本号 Version	变更内容 Content modified	修订日期 Date	修订者 Modified by
A0	首次发布 First released	2022/11/04	
A1	肩高增加 Increased shoulder height	2022/12/23	

1 适用范围 Scope of Application

本产品规格书规定了本企业生产的 PF300-166A 锂离子电芯的性能要求、试验方法、检验规则、标志、包装、运输、贮存、安全要求。

This file defines the performance requirements, test methods, inspection rules, signs, packing, transportation, storage and safety requirements of rechargeable Lithium-ion battery cell - PF300-166A, produced by the enterprise.

2 规范性引用文件 Applicable standards

下列文件中的条款通过本标准的引用而成为本标准的条款。凡是不注日期的引用文件，其最新版本适用于本标准。

GB/T 2900.41 电工术语原电芯和电芯

GB/T 19596 电动汽车术语

GB/T 31484-2015 电动汽车用动力蓄电池循环寿命要求及试验方法

GB 38031-2020 电动汽车用动力蓄电池安全要求及试验方法

GB/T 31486-2015 电动汽车用动力蓄电池电性能要求及试验方法

The clauses in the following documents become clauses of this standard after being quoted in this standard. For undated references, the latest version is applicable to this standard.

GB/T 2900.41 Electrotechnical terminology -- Primary cell and battery

GB/T 19596 Terminology of electric vehicles

GB/T 31484-2015 Cycle life requirements and test methods for traction battery of electric vehicle

GB 38031-2020 Electric vehicle traction battery safety requirements

GB/T 31486-2015 Cycle life requirements and test methods for traction battery of electric vehicle

3 术语和定义 Terms & Definition

3.1 产品：本规格书中的产品是指本企业生产的 PF300-166A 可充电磷酸铁锂电芯

Product: Rechargeable Lithium-ion cell PF300-166A, produced by the enterprise.

3.2 客户：客户是指购买本规格书所述产品的公司，企业或个人

Customer/client: Company or person to buy this product.

3.3 室温条件：缩写符号 RT，环境温度为 25±2℃。

Room temperature: The abbreviation RT, the ambient temperature is 25±2℃.

3.4 倍率电流：缩写符号 C，1C 表示电芯以 1 小时率充放电的电流，2C 表示电芯以 1/2 小时率充放电的电流。

Rate current: Abbreviated in C, 1C represents the current that the cell charge and discharge at 1 hour; 0.5C represents the current that the cell charge and discharge at 2 hours.

3.5 直流内阻：电芯在环境温度 RT、50%SOC 条件下，以 2C 电流放电 10s，计算放电前后的电压和电流变化，然后将电压变化的差值除以电流变化的差值，即为直流内阻。

DC internal resistance：Under the ambient temperature RT and 50% SOC, the cell discharges at 2C current for 10s, calculates the voltage and current changes before and after the discharge, and then divides the difference of voltage changes by the difference of current changes, which is the DC internal resistance.

3.6 最大持续充电电流：电芯在指定温度下，保证电芯正常工作所允许进行持续充电的最大电流。

Maximum continuous charging current: The maximum current allowed for continuous charge to ensure the cell normal operation at specified temperature.

3.7 最大持续放电电流：电芯在指定温度下，保证电芯正常工作所允许进行持续放电的最大电流。

Maximum continuous discharging current: The maximum current allowed for continuous discharge to ensure the cell normal operation at specified temperature.

3.8 恒流充电容量比例：电芯在环境温度 RT、0%SOC 条件下，以某一倍率下恒流充电至 3.65V 截止的充电容量与标准充电方法下的充电容量的比值。

Constant current charging capacity ratio: the ratio of the charging capacity of the cell charged to 3.65V at a constant current at a certain rate to the charging capacity under the standard charging method under the ambient temperature RT and 0% SOC.

3.9 周围环境温度：电池所处的周围环境温度。

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

3.10 电芯温度：由接入电池的温度传感器测量的电芯的温度，温度传感器和测量线路的选择由双方共同商定。

Cell temperature: The temperature of the cell measured by the temperature sensor connected to the battery. The selection of the temperature sensor and the measurement circuit is jointly negotiated by the customer and the enterprise.

3.11 充电状态（SOC）：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充电容量状态的所有的线性关系。100%的充电状态表示电池满充到 3.65V，0%的充电状态表示电池完全放电到 2.5V。

State of charge (SOC): All linear relationships of the state of cell charging capacity measured in ampere-hours or watt-hours under no-load conditions. A state of 100% means that the battery is fully charged to 3.65V, and a state of 0% means that the battery is fully discharged to 2.5V.

4 基本性能 Basic performance

表 1 基本性能

Table 1 Basic performance

序号 NO.	项目 Item	规格 Spec	备注 Remark
4.1	外观 Appearance	表面清洁、无锈蚀、无划痕、无毛刺、无变形及机械损伤，无电解液泄露 clean surface, no rust, no scratches, no burrs, no deformation and mechanical damage, no electrolyte leakage	
4.2	尺寸 Dimension	厚度 Thickness：39.2±0.5 mm 宽度 Width：300.7±0.5 mm 肩高 Shoulder height：110.8±0.5 mm 总高 Total height：113.5±0.5 mm	厚度测试条件： SOC ≤30%、300±10kgf 压力 Thickness test condition: SOC≤30%，pressure of 300±10kgf
4.3	重量 Weight	2.97kg±0.10Kg	
4.4	标称电压 Nominal voltage	3.22V	1/3C，RT
4.5	交流内阻 AC internal Resistance	≤0.5mΩ	RT，1KHz

4.6	标称容量 Nominal capacity	166Ah	1/3C，RT，2.5V-3.65V
4.7	工作电压 Operation voltage	2.5V～3.65V	＞0℃
		2.0V～3.65V	≤ 0℃
4.8	能量密度（实际） Energy density (actual)	～180Wh/kg	1/3C，RT
4.9	出货荷电状态 Delivery capacity （SOC）	4%~50%，常规 routine 30%	可调整 Adjustable

5 电性能 Electric performance

5.1 充电性能 Charging capacity

表 2 充电性能

Table 2 Charging capacity

序号 NO.	项目 Item	规格 Spec	备注 Remark
5.1.1	最大持续充电电流 Maximum continuous charging current	不允许充电 No charge	≤0℃
		0.10C	0℃～5℃
		0.50C	5℃～15℃
		1.00C	15℃～45℃
		0.50C	45℃～55℃
		不允许充电 No charge	＞55℃
5.1.2	最大脉冲充电电流 Maximum pulse charging current	2.0C	RT，50%SOC，10S
5.1.3	最大允许充电电压 Cut-off charging voltage	3.65V	

5.2 放电性能 Discharging capacity

表 3 放电性能

Table 3 Discharging capacity

序号 NO.	项目 Item	规格 Spc	备注 Remark
5.2.1	最大持续放电电流 Maximum continuous discharging current	1.5C	-30℃～55℃
		不允许放电 No discharge	≥55℃
5.2.2	最大脉冲放电电流 Maximum pulse discharging current	3.0C	RT，≥10% SOC，60s
5.2.3	最低允许放电电压 Cut-off discharging voltage	2.5V	＞0℃
		2.0V	≤ 0℃

5.2.4	允许放电温度范围 Allowable discharging temperature range	-30℃～55℃	
5.2.5	室温放电容量 Room temperature discharge capacity	≥166Ah	RT, 0.33C 放电 discharge，2.5V-3.65V
5.2.6	高温放电容量保持率 High temperature discharge capacity retention rate	≥98%	55℃, 1C，参见 7.5 more on 7.5
5.2.7	低温放电容量保持率 Low temperature discharge capacity retention rate	≥80%	-20℃, 1C，截止电压 2.0V，参见 7.4 cut-off voltage 2.0V, more on 7.4

5.3 循环性能 Cycle life

表 4 循环性能
Table 4 Cycle life

序号 NO.	项目 Item	规格 Spc	备注 Remark
5.3.1	标准循环寿命 Cycle life	≥2500 次（80%EOL）	25℃，带夹具测试，参见 7.8 With fixture, more on 7.11

5.4 存储性能 Storage performance

表 5 存储性能
Table 5 Storage performance

序号 NO.	项目 Item	规格 Spc	备注 Remark
5.4.1	室温荷电保持率 Capacity retention rate @ RT	≥95%	25℃，28D，100%SOC，参见 7.6 more on 7.6
5.4.2	室温容量恢复率 Capacity recovery rate@ RT	≥96%	
5.4.3	高温荷电保持率 Capacity retention rate@ high-temp.	≥95%	55℃，7D，100%SOC，参见 7.6 more on 7.6
5.4.4	高温容量恢复率 Capacity recovery rate@ high-temp.	≥95%	
5.4.5	存储容量恢复率 Capacity recovery rate of storage	≥90%	45℃，28D，50%SOC，参见 7.7 more on 7.7

6 安全性能 Safety performance

表 6 安全性能

Table 6 Safety performance

序号 No.	项目 Item	规格 Spec	备注 Remark
6.1	过放电 Over discharge	不爆炸，不起火 No fire, No explosion	测试方法见 7.9 See test method on 7.9
6.2	过充电 Over charge	不爆炸，不起火 No fire, No explosion	测试方法见 7.10 See test method on 7.10
6.3	短路 Short circuit	不爆炸，不起火 No fire, No explosion	测试方法见 7.11 See test method on 7.11
6.4	加热 Heating	不爆炸，不起火 No fire, No explosion	测试方法见 7.12 See test method on 7.12
6.5	挤压 Crush	不爆炸，不起火 No fire, No explosion	测试方法见 7.13 See test method on 7.13
6.6	温度循环 Temperature cycle	不爆炸，不起火 No fire, No explosion	测试方法见 7.14 See test method on 7.14

7 测试方法 Test methods

7.1 标准测试条件 Standard test method

电芯应为新产品（在制造后少于 1 个月储存），循环次数少于 5 次。除非另有说明，本规范中的所有测试条件如下：

温度为 25 ℃ ±2 ℃，相对湿度为 15%～90%，大气压力 86 kPa～106 kPa。本规格书所提到的室温，是指 25 ℃ ±2 ℃。

The cell being tested should be newly manufactured (less than one-month storage and less than 5 times cycled). Unless otherwise indicated, all test conditions in this specification are as follows:

The temperature is 25℃±5℃, the relative humidity is 15% to 90%, and the atmospheric pressure is 86kPa to 106kPa. The room temperature (RT) mentioned in this specification refers to 25℃ ± 2℃.

7.2 标准充电 Standard charge

① 室温下，电芯以 1/3C 电流放电至电压为 2.5V，静置 30min；

② 电芯以 1/3C 电流充电至电压为 3.65V 时转恒压充电，至充电电流降至 0.05C 时停止充电，静置 30min。

① The cell is discharged to 2.5V at constant current of 1/3C，then rest 30 minutes；

② The cell is charged to 3.65V at constant current of 1/3C，and then continuously charged at a constant voltage of 3.65V until the cut-off current is 0.05C, then rest 30 minutes.

7.3 标准放电 Stand discharge

先按照 7.2 充满电，室温下，电芯以 1/3C 电流放电至电压为 2.5V。

Fully charge according to 7.2, at RT, the cell is discharged to 2.5V at constant current of 1/3C.

7.4 低温放电容量保持率 Low temperature discharge capacity retention rate

按 7.2 方法充电；在 5.2.7 规定温度下存储 12h；在对应温度下以 1C 电流放电，放电至 2.0V。按此方法测试不同温度下的放电能力，其与初始容量的比值。

Fully charge according to 7.2; Store at the specified temperature in 5.2.7 for 12h; Discharge at the corresponding temperature with 1C current to 2.0V. According to this method, the discharge capacity at different temperatures and its ratio to the initial capacity are tested.

7.5 高温放电容量保持率 High temperature discharge capacity retention rate

按 7.2 方法充电；在 55℃±2℃下存储 5h；在 55℃±2℃下以 1C 电流放电，放电至 2.5V，得到高温放电容量，其与初始容量的比值。

Fully charge according to 7.2; Store at 55℃± 2℃ for 5h; Discharge at a current of 1C at 55℃± 2℃ to 2.5V to obtain the high-temperature discharge capacity, which is the ratio of the initial capacity.

7.6 荷电保持率/容量恢复率 Capacity retention rate/Capacity recover rate

按 7.2 方法充电，在室温下存储 28 天或在 55℃±2℃下存储 7 天后，以 1C 电流放电至 2.5V，得到放电容量，其与初始容量的比值即为荷电保持率；按 7.2 方法充电和 7.3 方法放电，得到恢复容量，其与初始容量的比值即为容量恢复率。

Fully charge according to 7.2; Store at room temperature for 28D, or store at 55℃±2℃ for 7D, then discharge to 2.5V at constant current of 1C, obtaining discharge capacity, its ratio to the initial capacity is the charge retention rate; The recovery capacity is obtained by charging as per 7.2 and discharging as per 7.3, and its ratio to the initial capacity is the capacity recovery rate.

7.7 存储容量恢复率 Capacity recovery rate of storage

按 7.2 方法充电，在室温下以 1C 电流放电 30min 后，在 45℃±2℃下存储 28 天，按 7.2 方法充电，在室温下以 1C 电流放电至 2.5V，得到放电容量，其与初始容量的比值即为存储容量恢复率。

Charge as per 7.2. After discharging at 1C at room temperature for 30min, store at 45℃± 2℃ for 28 days. Charge as per 7.2. Discharge at 1C at room temperature to 2.5V to obtain the discharge capacity. The ratio of the discharge capacity to the initial capacity is the storage capacity recovery rate.

7.8 标准循环寿命 Cycle life

电芯在室温环境下，50% SOC 状态下上夹具，夹具尺寸不小于电芯大面尺寸夹具力 300±20kgf，按照如下步骤测试循环寿命。

a) 电芯以 1C（A）放电至放电终止条件；

b) 搁置 1 h；

c) 电芯按 7.2 方法充电；

d) 搁置 1 h；

e) 电芯以 1C 放电至 2.5V，记录放电容量；

f) 按照 b）～e）连续循环，直至放电容量为初始容量的 80%;

g) 计量室温放电容量。

Take the cell on a fixture of the size more than the cell, keep the cell under pressure of 300±20kgf@50%SOC, then test the cycle life according to following steps at RT:

a) The cell is discharged to cut-off voltage；

b) Rest 1 h；

c) The cell is charged according to 7.2；

d) Rest 1 h；

e) The cell is discharged to 2.5V at constant current of 1C, record discharge capacity；

f) Repeat b）～e）, until the discharge capacity is 80% of initial capacity;

g) Measuring room temperature discharge capacity。

7.9 过放电 Over discharge

按 7.2 方法充电，在室温下以 1C 电流放电 90min，结束后观察 1h。

The cell is charged according to 7.2, discharge at 1C current for 90 minutes at RT, observe for 1 hour.

7.10 过充电 Over charge

①按 7.2 进行初始化充电；

②在室温下以不小于 1/3C 的电流恒流充电至充电终止电压的 1.1 倍或 115%SOC 后，停止充电，观察 1h。

①The cell is charged according to 7.2;

②At room temperature, charge at a constant current of no less than 1/3C to 1.1 times of the charging termination voltage or 115% SOC, then stop charging and observe for 1h.

7.11 短路 Short circuit

按 7.2 方法充电，电芯正、负极经外部短路 10min，外部线路电阻＜5mΩ，结束后观察 1h。

The cell is charged according to 7.2; short circuit externally for 10 minutes with line resistance <5mΩ, observe for 1 hour.

7.12 加热 Heating

按 7.2 方法充电，待测电芯在热滥用试验箱中加热，以 5℃/min 速度升温至 130±2℃，并保持 30min 后停止加热，观察 1 小时。

The cell is charged according to 7.2; the cell is placed into oven, and the temperature to of the oven is raised at a rate of 5℃/min to a temperature of 130±2℃ and remain for 30 minutes at the temperature before the test is discontinued, observe for 1 hour.

7.13 挤压 Crush

挤压试验按照如下步骤进行:

①按 7.2 进行初始化充电；

②按下列条件进行试验：

——挤压方向：垂直于电芯极板方向施压（参考图 1 所示）；

——挤压板形式：半径 75mm 的半圆柱体，半圆柱体的长度（L）大于被挤压电芯的尺寸；

——挤压速度：（5±1）mm/s；

——挤压程度：电压达到 0V 或变形量达到 30%或挤压力达到 200kN 后停止挤压，保持 10min。

③观察 1 h。

Test the crush according to following steps：

①The cell is charged according to 7.2;

②Test according to following conditions:

a) Crushing direction: The force for the crushing shall be applied in direction nearly perpendicular to a layered face of positive and negative electrodes inside cell (refer to Figure 1);

b) Crushing tool shape: A semicylinder with a 75mm diameter, and the length more than the cell;

c) Crushing speed: (5±1) mm/s;

d) Crushing degree: voltage of the cell to 0V, or a deformation of 30% or more of initial cell dimension occurs, or the pressure has reached 200kN, remain for 10 minutes before the test is discontinued.

③Observe for 1 hour.

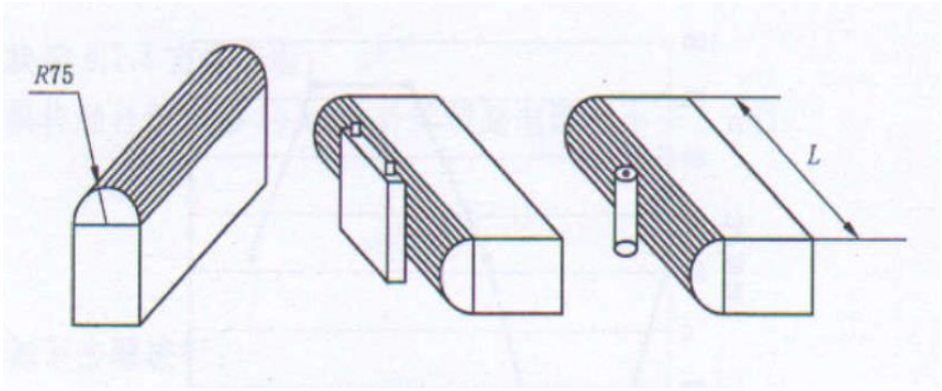


图 1 挤压板和挤压示意图

Figure 1 Schematic diagram of extrusion plate and extrusion

7.14 温度循环 Temperature cycle

温度循环试验按照如下步骤进行：

a) 电芯按 7.2 方法充电；

b) 电芯放入温度箱中，温度箱温度按照表 7 和图 2 进行调节，循环次数 5 次；

c) 观察 1h。

The temperature cycling test shall be conducted as follows:

a) The cell is charged according to 7.2;

b) Put the battery into the temperature box. Adjust the temperature of the temperature box according to Table 8 and Figure 2, and cycle 5 times;

c) Observe for 1 hour.

表 7 温度循环试验一个循环的温度和时间

Table 7 Temperature and time of one cycle of temperature cycling test

温度/℃ Temperature	时间增量/min time increment	累计时间/min cumulative time	温度变化率/℃/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

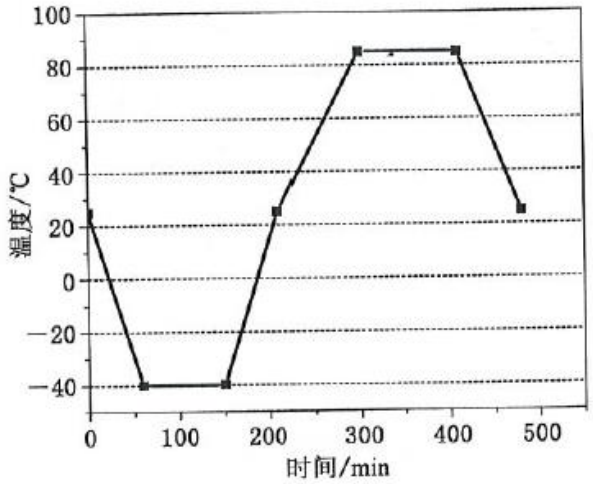


图 2 温度循环试验示意图

Figure 2 Schematic Diagram of Temperature Cycle Test

8 标志、包装、运输、贮存 Label, Packing, Transportation, Storage

8.1 标志 Labeling

每个产品上应有清晰的二维码。

Each product should have a clear QR code on it.

8.2 包装 Packing

产品有外包装，保证产品在运输、装卸、堆放过程中不受机械损伤。

The product has outer packaging to ensure that the product is not mechanically damaged during transportation, loading, unloading and stacking.

8.3 运输 Transportation

在运输过程中应严禁暴力装卸，防止剧烈振动、冲击或挤压，防止日晒雨淋。

During transportation, violent loading and unloading should be strictly prohibited, to prevent server vibration, impact or squeeze, and to prevent from the sun and rain.

8.4 贮存 Storage

产品应贮存在环境温度为-20℃～45℃，相对湿度<95％的清洁、干燥、通风的库房内，库房内不应含有腐蚀性气体；产品应远离火源和热源（不得少于 2m）。

建议电芯在 30%～50% SOC 下存储。电芯长期不使用时，每三个月进行一次充放电，并补电至 30%～50% SOC，以免电芯过放，影响性能。

The product should be stored in a clean, dry and ventilated warehouse with an ambient temperature of -20℃~45℃ and a relative humidity of <95％. The warehouse should not contain corrosive gases; the product should be away from fire and heat sources (not less than 2m.).

It is recommended that the cell be stored at 30% to 50% SOC. When the cell is not used for a long time, charge and discharge it every three months, and charge to 30%~50% SOC to avoid over discharge and affect its performance.

存储期 1 个月 Storage period 1 month: -40 ℃ ~ 55 ℃

存储期 3 个月 Storage period 3 months: -20 ℃ ~ 40 ℃

存储期 12 个月 Storage period 12 months: 5 ℃ ~ 35 ℃

9 安全及警告 Safety & Warning

9.1 在使用之前，应详细阅读规格书。

Before using, you should read the specifications in detail.

9.2 禁止将电芯浸入水中或者其它导电性液体中。

Do not immerse the cell into water or other conductive liquids.

9.3 禁止将电芯投入火中或者长期暴露电芯工作范围外的温度中，电芯温度不能超过 60℃，如果电芯中电芯温度超过 60℃，停止电芯运行。

It is forbidden to put the cell into fire or expose it to the environment beyond its working temperature range for a long time. If the working temperature of the cell exceeds 60℃, stop its operation.

9.4 严格按照标示和说明连接电芯正负极，禁止反向充电。

Connect the positive and negative poles of the cell strictly in accordance with the signs and instructions. No reverse charging.

9.5 当电解液泄漏时，应避免皮肤和眼睛接触电解液。如有接触，应使用大量的清水清洗接触到的区域并向医生寻求帮助。禁止任何人或动物吞食电芯的任何部件或电芯所含物质。

When the electrolyte leaks, avoid contacting the electrolyte to skin and eyes. In case of contacting, wash with plenty of water and seek medical advice. It is forbidden for any person or animal to swallow any part of the cell or the substance contained in the cell.

9.6 尽力保护电芯，使其免受机械振动、碰撞及压力冲击，否则电芯内部可能短路，产生高温或火灾。

Protect the cell from mechanical vibration, collision and pressure impact, otherwise the cell might be short-circuited, causing high temperature or fire.

9.7 严禁使电芯承受过重的机械冲击。

Strictly forbidden to subject the cell to excessive mechanical shock.

9.8 严禁使用过程中发生挤压、跌落、短路、漏液及其他不正常问题的电芯。

Squeeze, drop, short circuit, leakage and other abnormal problems is strictly forbidden during cell operation.

9.9 在使用过程中严禁各电芯之间外壳直接接触或通过导体连接在一起形成通路。

During use, it is strictly forbidden to contact the cover of cells directly or connect them together via conductors to form a circuit.

9.10 电芯应该在远离静电的场所进行存储、使用。

Cells should be stored and used in a place away from static electricity

9.11 在使用、充放电或者存储过程中发现电芯急剧变热、散发气味、变色、变形或者其他反应，应立即停止使用，并进行相应的处理。

During operation, charge, discharge or storage, if the cell suddenly heats-up, emits odor, discolors, deforms or has other reactions, it should be stopped immediately and treated accordingly.

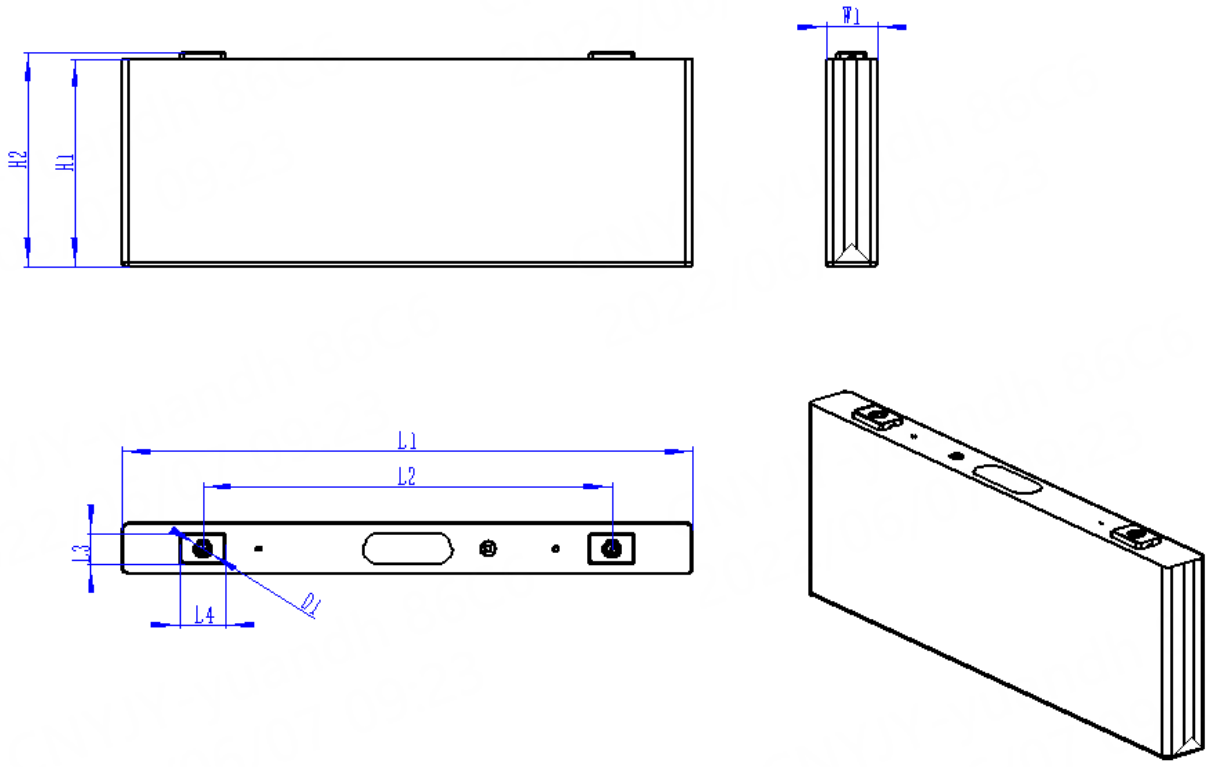
10 产品寿命终止管理 End of life management

为了确保电芯的安全应用，客户需要建立有效的跟踪系统监测并记录每个电芯的电压、内阻，测量方法和计算方法需要客户和本企业共同讨论和双方同意，当使用电芯的内阻超过这个电芯内阻的 250%时，或容量衰减到初始容量的 80%时应停止使用电芯，违反该项要求，将免除本企业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。

In order to ensure the security during using cells, the clients should establish an effective tracking system to monitor and record the voltage and internal resistance of each cell, the measurement and calculation methods should be discussed and commonly agreed by the clients and the enterprise, when the internal resistance of the used cell exceeds 250% of the initial internal resistance of this cell, or the capacity of the cell decays to 80% of the initial capacity, the use of the cell should be stopped. Otherwise, the enterprise will not bear the product quality assurance responsibility based on the product sales agreement and this specification.

附录 Appendix

电芯尺寸图 Cell dimension



序号 NO.	代码 Item	尺寸（mm）Dimensions
1	L1	300.7±0.5
2	L2	215.0±0.5
3	H1	110.8±0.5
4	H2	113.5±0.5
5	W1	39.2±0.5
6	L3	24±0.05
7	L4	24±0.05

图 3 电芯尺寸图
Figure 3 Cell dimension