



新能源动力及储能系统专家
NEW ENERGY POWER AND ENERGY STORAGE SYSTEM EXPERT

产品规格书

Production Specification

电池型号 Battery Module: CB67
电芯类型 Cell Type: Li-ion
电芯型号 Cell Model: CB67-306Ah

| Manufacturer | Prepare/Date | Check/Date | Approval/Date |
|-------------------|--------------|------------|---------------|
| | | | |
| Customer Approval | Prepare/Date | | Approval/Date |
| | | | |

瑞浦兰钧能源股份有限公司
REPT BATTERO Energy Co., Ltd.

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1 适用范围 Scope

本产品规格书规定了 CB67-306Ah 型锂离子电池的性能要求、试验方法、运输、贮存要求和注意事项等。

This document is applicable to the CB67-306Ah Li-ion battery produced by REPT co. LTD. This document covers performance requirements, test procedures, transportation and storage requirements and other items need to notice.

2 规范性引用文件 Reference Documents

下列文件对于本文件的应用是必不可少的。凡是注日期的引用文件，仅注日期的版本适用于本文件。凡是不注日期的引用文件，其最新版本（包括所有的修改单）适用于本文件。

The following documents are essential for this document. For reference documents with date, only dated versions apply to this document. For reference documents with date, the latest version (including all amendments) applies to this document.

GB/T 36276—2018 电力储能用锂离子电池

GB/T 36276—2018 Uthium ion battery for electrical energy storage

GJB 4477—2002 锂离子蓄电池组通用规范

GJB 4477—2002 General specification for Li-ion batteries

GB 2900.41—2008 电工术语 原电池与蓄电池

GB 2900.41—2008 Electrotechnical terminology Primary and secondary cells and batteries

3 性能指标 Performance Requirements

注：指标只针对于新电池。

Note: The following specifications are only available to fresh batteries.

| 序号 No. | 项目 Item | 规格 Specification | 备注 Comment |
|-----------|--------------------------|---------------------|-------------------|
| 3.1 | 标称容量 Nominal Capacity | 306Ah | 25±2°C, 0.5P/0.5P |
| 3.2 | 标称电压 Nominal | 3.2V | |

| | | | |
|------|--|---|--|
| | Voltage | | |
| 3.3 | 工作电压范围 Operating Voltage | 2.5-3.65V | 0°C < T ≤ 55°C |
| | | 2.0-3.65V | -30°C ≤ T ≤ 0°C |
| 3.4 | 标准放电功率 Standard Discharging Power | 489.6W | 25±2°C |
| 3.5 | 最大持续放电功率 Maximum Continuous Discharging Power | 489.6W | 25±2°C |
| 3.6 | 峰值放电功率 Maximum Discharging Power | 979.2W | @60s, SOC ≥ 20% |
| 3.7 | 标准充电功率 Standard Charging Power | 489.6W | 25±2°C |
| 3.8 | 最大持续充电功率 Maximum Continuous Charging Power | 489.6W | 25±2°C |
| 3.9 | 峰值充电功率 Maximum Charging Power | 979.2W | @60s, SOC ≤ 80% |
| 3.10 | 使用温度 Operating Temperature | 0°C < T ≤ 55°C | 充电 Charge |
| | | -30°C ≤ T ≤ 60°C | 放电 Discharge |
| 3.11 | 贮存温度 Storage Temperature | -30°C~60°C | 存储环境湿度 ≤ 95%ROH, 无凝露 Storage ambient humidity < 95%ROH, no condensation |
| 3.12 | 电池尺寸 Typical Dimension | 厚度 Thickness: 71.7 ± 0.50mm 宽度 Width: 174.00 ± 0.50mm 肩高 Shoulder Height : 204.40 ± 0.60mm 总高 Total Height : 206.80 ± 0.60mm | @3000 ± 200N, 40%SOC |
| 3.13 | 正极材料 Cathode Material | 磷酸铁锂 LiFePO ₄ | |
| 3.14 | 电池重量 Cell Weight | 5.55 ± 0.2kg | |
| 3.15 | 能量密度 Energy Density | ~176Wh/kg | |
| | | ~385Wh/L | |

| | | | |
|------|--|--|------------|
| 3.16 | 电池内阻 ACR (1KHz) | $\leq 0.30m\Omega$ | 25%~50%SOC |
| 3.17 | 标准充电模式 (0.5P) Standard Charging Method | <p>在环境温度(25±2)°C条件下, 采用恒功率方式充电, 恒功率为 0.5P₁(W)。电池 0.5P₁(W)恒功率放电至 2.5V, 搁置 10 分钟。再以 0.5P₁(W)恒功率充电至 3.65V, 静置 10 分钟。</p> <p>In an ambient temperature of 25±5°C, cell is charged with constant power of 0.5P₁(W). The cell is discharged with constant power of 0.5P₁(W) until 2.5V and rest ten minutes. Then battery is charged with constant power of 0.5P₁(W) until 3.65V and rest ten minutes.</p> | 0.5P/0.5P |
| 3.18 | 标准放电模式 (0.5P) Standard Discharging Method | <p>在环境温度(25±2)°C条件下, 采用恒功率方式放电, 恒功率为 0.5P₁(W)。电池以 0.5P₁(W)恒功率充电至 3.65V, 搁置 10 分钟。再以 0.5P₁(W)恒功率充电至 2.5V, 静置 10 分钟。</p> <p>In an ambient temperature of 25±5°C, cell is discharged with constant power of 0.5P₁(W). The cell is charged with constant power of 0.5P₁(W) until 3.65V and rest ten minutes. Then battery is discharged with constant power of 0.5P₁(W) until 2.5V and rest ten minutes.</p> | 0.5P/0.5P |

4 电性能 Electrical Performance

4.1 标准测试条件 Standard Test Conditions

电池应为新产品(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:

The following parameters are only applicable to new products delivered to customers by REPT, not for the products after use. Storage time is less than one month and cycle number is less than 5 times.

温度: 25±2°C, 湿度: 15%~90% RH, 气压: 86kPa~106kPa。规格书中室温指的是 25±2°C, 1I₁(A)电流为 306A, 1P₁(W)功率为 979.2W。

Temperature : 25±2°C, Humidity : 15%~90%RH, Pressure : 86kPa~106kPa. Room

temperature is $25\pm 2^{\circ}\text{C}$, $I_{11}(\text{A})$ current is 306A, $1P_1(\text{W})$ power is 979.2W in this document.

(1) 充电模式 Charge mode

| Temperature | Standard charging | Fast charging |
|---|-----------------------------------|-----------------------------------|
| $T \leq 0^{\circ}\text{C}$ | Limited Charging | Limited Charging |
| $0^{\circ}\text{C} < T < 10^{\circ}\text{C}$ | 0.1 $P_1(\text{W})$ CP to 80% SOC | 0.2 $P_1(\text{W})$ CP to 80% SOC |
| $10^{\circ}\text{C} \leq T < 15^{\circ}\text{C}$ | 0.2 $P_1(\text{W})$ CP to 3.65V | 0.3 $P_1(\text{W})$ CP to 3.65V |
| $15^{\circ}\text{C} \leq T < 45^{\circ}\text{C}$ | 0.5 $P_1(\text{W})$ CP to 3.65V | 1.0 $P_1(\text{W})$ CP to 3.65V |
| $45^{\circ}\text{C} \leq T \leq 55^{\circ}\text{C}$ | 0.2 $P_1(\text{W})$ CP to 3.65V | 0.3 $P_1(\text{W})$ CP to 3.65V |
| $> 55^{\circ}\text{C}$ | Limited charging | Limited charging |

(2) 放电模式 Discharge method

| 参数 | 产品规格 | 条件 |
|--|---------------------------|--|
| 标准放电功率 Standard Discharging Power | 489.6W | $25\pm 2^{\circ}\text{C}$ |
| 最大持续放电功率 Maximum Continuous Discharging Power | 489.6W | $25\pm 2^{\circ}\text{C}$ |
| 最大脉冲放电功率（长脉冲） Maximum Discharging Power(long pulse) | 979.2W | $25\pm 2^{\circ}\text{C}$, $\geq 30\% \text{SOC}$, 60s |
| 最小脉冲放电截止电压 Cut-off voltage | 2.5V | $25\pm 2^{\circ}\text{C}$ |
| 标准放电温度 Standard Discharge Temperature | $25\pm 2^{\circ}\text{C}$ | |

(3) 脉冲放电模式：Pulse discharge method

| SOC | 温度 Temperature | | | | | | | |
|-----------------|-------------------------|----------------------------|----------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| | $< -30^{\circ}\text{C}$ | $\geq -30^{\circ}\text{C}$ | $\geq -20^{\circ}\text{C}$ | $\geq 0^{\circ}\text{C}$ | $\geq 10^{\circ}\text{C}$ | $\geq 15^{\circ}\text{C}$ | $\geq 45^{\circ}\text{C}$ | $\geq 55^{\circ}\text{C}$ |
| $\geq 30\%$ | 0 | 61.2A /60s | 153A /60s | 306A /60s | 459A /60s | 612A /60s | 306A /60s | Limited |
| Cut-off voltage | 0 | 2.0V | 2.0V | 2.0V | 2.5V | 2.5V | 2.5V | Limited |

4.2 测试设备精度 Test Equipment Requirements

(1) 测试设备精度： $\pm 0.1\%$ 。

Measurement instrument accuracy is $\pm 0.1\%$.

(2) 电流测量精度： ≥ 0.5 级，电压测量精度： ≥ 0.5 级。

The accuracy of the multimeter to measure voltage and current should be not less than grade 0.5.

(3) 温度测量精度： $\pm 0.5^{\circ}\text{C}$ 。

Temperature measurement precision is not lower than $\pm 0.5^{\circ}\text{C}$.

(4) 时间测量精度： $\pm 0.1\%$ 。

Time measurement precision is not lower than $\pm 0.1\%$.

(5) 尺寸测量精度: $\pm 0.1\%$ 。

Size dimension accuracy: is $\pm 0.1\%$.

4.3 测试过程 Electrical Performance Test

| 序号 No. | 项目 Item | 测试过程 Testing method | 标准 Criteria |
|-----------|--|--|--|
| 4.3.1 | 室温放电能量 (初始放电能量) Room temperature discharge energy (Initial discharge energy) | 1) 测试温度: $25\pm 2^{\circ}\text{C}$ Test temperature: $25\pm 2^{\circ}\text{C}$ 2) 根据 3.18 将电池放电 Discharge the cell according to No. 3.18. 3) 将电池以 $0.5P_1(\text{W})$ 功率充电至 3.65V 并静置 10 分钟, 记录充电能量(Wh)。 Charge the cell with a power at $0.5P_1(\text{W})$ to 3.65V, rest 10 minutes and record charge energy. 4) 将电池以 $0.5P_1(\text{W})$ 功率放电至 2.5V 并记录放电能量(Wh)。 Discharge the cell with a power at $0.5P_1(\text{W})$ to 2.5V and record discharge energy . | 无变形、膨胀、漏液 No apparent deformation and leakage 初始放电能量 $\geq 100\% * \text{额定放电能量}$ Initial discharge energy $\geq 100\% * \text{Rated discharge energy}$ 初始充放电能量效率 $\geq 93\%$ Initial energy efficiency $\geq 93\%$ |
| 4.3.2 | 室温倍率充电 Room temperature charge rate | 1) 测试温度: $25\pm 2^{\circ}\text{C}$ Temperature: $25\pm 2^{\circ}\text{C}$. 2) 将电池以 $0.5P_1(\text{W})$ 放电至 2.5V, 并静置 10 分钟。 Discharge the cell with a power at $0.5P_1(\text{W})$ to 2.5V and rest 10 minutes . 3) 将电池以 $1P_1(\text{W})$ 功率充电至 3.65V 并静置 10 分钟, 记录充电能量(Wh)。 Charge the cell with a power at $1P_1(\text{W})$ to 3.65V , rest 10 minutes and record charge energy. | 无变形、膨胀、漏液 No apparent deformation and leakage 充电能量 $\geq 95\% * \text{初始充电能量}$ Discharge energy $\geq 95\% * \text{Initial charging energy}$ |
| 4.3.3 | 室温倍率放电 Room temperature discharge rate | 1) 测试温度: $25\pm 2^{\circ}\text{C}$ Temperature: $25\pm 2^{\circ}\text{C}$. 2) 根据 3.17 将电池充满电 Full charge cell according to No. 3.17. 3) 将电池以 $1P_1(\text{W})$ 功率放电至 2.5V 并记录放电能量(Wh)。 Discharge the cell with a power at $1P_1(\text{W})$ to 2.5V and record discharge energy. | 无变形、膨胀、漏液 No apparent deformation and leakage 放电能量 $\geq 95\% * \text{初始放电能量}$ Discharge energy $\geq 95\% * \text{Initial discharging energy}$ |

| | | | |
|-------|---|--|--|
| 4.3.4 | 高温充放电能量 High temperature charge and discharge energy | <ol style="list-style-type: none"> 1) 测试温度: 25±2°C. Temperature:25±2°C. 2) 将电池以 0.5P₁(W)放电至 2.5V, 并静置 10 分钟。 Discharge the cell with a power at 0.5P₁(W) to 2.5V and rest 10 minutes . 3) 将电池在 45±2°C静置 5h Temperature:45±2°C rest 5 hours. 4) 在 45±2°C下将电池以 0.5P₁(W)功率充电至 3.65V, 搁置 10 分钟并记录充电能量(Wh)。 Charge the cell with a power at 0.5P₁(W) to 3.65V at 45±2°C, rest 10 minutes and record charge energy(Wh). 5) 在 45±2°C下将电池以 0.5P₁(W)功率放电至 2.5V, 搁置 10 分钟并记录放电能量(Wh)。 Discharge the cell with a power at 0.5P₁(W) to 2.5V at 45±2°C, rest 10 minutes and record discharge energy(Wh). | <p>无变形、膨胀、漏液 No apparent deformation and leakage 充电能量≥额定充电能量 Charge energy≥Rated charging energy 放电能量≥额定放电能量 Discharge energy≥Rated discharging energy 能量效率≥93% energy efficiency≥93%</p> |
| 4.3.5 | 低温充放电能量 Low temperature charge and discharge energy | <ol style="list-style-type: none"> 1) 测试温度: 25±2°C. Temperature:25±2°C. 2) 将电池以 0.5P₁(W)放电至 2.5V, 并静置 10 分钟 Discharge the cell with a power at 0.5P₁(W) to 2.5V and rest 10 minutes . 3) 将电池在 5±2°C静置 5h. Temperature:5±2°C rest 20 hours. 4) 在 5±2°C下将电池以 0.5P₁(W)功率充电至 3.65V, 搁置 10 分钟并记录充电能量(Wh) Charge the cell with a power at 0.5P₁(W) to 3.65V at 5±2°C, rest 10 minutes and record charge energy(Wh). 5) 在 5±2°C下将电池以 0.5P₁(W)功率放电至 2.5V, 搁置 10 分钟并记录放电能量(Wh) Discharge the cell with a power at 0.5P₁(W) to 2.5V at 5±2°C, rest 10 minutes and record discharge energy(Wh). | <p>无变形、膨胀、漏液 No apparent deformation and leakage 充电能量≥80%*额定充电能量 Charge energy≥80%*Rated charging energy 放电能量≥80%*额定放电能量 Discharge energy≥80%*ated discharging energy 能量效率≥80% Energy efficiency≥80%</p> |
| 4.3.6 | 循环寿命 Cycle Life | <ol style="list-style-type: none"> 1) 测试温度: 25±2°C Test temperature: 25±2°C. 2) 初始夹紧力 300±20Kgf Under 300±20 Kgf preload. 3) 电池采用恒功率方式充电, 以 0.5P₁(W)恒功率充电至 3.65V, 静置 30 分钟。 Charge the cell with a power at 0.5P₁(W) to 3.65V, rest 30 minutes. 4) 以 0.5P₁(W)功率放电至 2.5V, 并静置 30min Discharge the cell with a power at 0.5P₁(W) to 2.5V and rest 30 minutes. 5) 重复 3)和 4)步骤, 直到电池能量小于 70% 的初始能量, 并记录循环次数。 Cycle step 3) and 4) until energy loss is more than 30% and record cycle number. | <p>循环寿命≥8000 次 Cycle number≥8000 times</p> |

| | | | |
|-------|---|--|---|
| 4.3.7 | <p>高温能量保持与恢复 High temperature energy remaining and recovery</p> | <ol style="list-style-type: none"> 1) 测试温度: 25±2°C. Temperature:25±2°C. 2) 根据 3.17 将电池充满电。 Full charge cell according to No. 3.17. 3) 将电池在 45±2°C下存储 30 天。 Storage the cell at 45±2°C for 30 days. 4) 在 25±2°C搁置 5 小时, 将电池以 0.5P₁(W)功率放电至 2.5V, 搁置 10 分钟并记录剩余能量(Wh). Rest at 25±2°C for 5h, discharge the cell with a power at 0.5P₁(W) to 2.5V, rest 10 minutes and record remaining energy 5) 根据 3.17 将电池充满电。 Full charge cell according to No. 3.17. 6) 在 25±2°C下将电池以 0.5P₁(W)功率放电至 2.5V, 并记录恢复能量(Wh). Discharge the cell with a power at 0.5P₁(W) to 2.5V at 25±2°C and record recovery energy. | <p>无变形、膨胀、漏液 No apparent deformation and leakage</p> <p>剩余能量≥95%*初始能量; Energy loss≤8%* Nominal energy.</p> <p>恢复能量≥95%*初始能量 Recovery energy≥94%* Initial energy</p> |
| 4.3.8 | <p>高温存储和恢复 High temperature energy storage and recovery</p> | <ol style="list-style-type: none"> 1) 根据 3.17 将电池充满电 Full charge cell according to No. 3.17. 2) 在 25±2°C下将电池以 0.5P₁(W) 放电至放电能量达到 50%初始放电能量后, 在 45±2°C下存储 30 天。 Discharge the cell with a power at 0.5P₁(W) to 50% nominal discharge energy at temperature of 25±2°C. Storage the cell at temperature of 45±2°C for 30 days. 3) 在 25±2°C下搁置 5 小时后将电池以 0.5P₁(W) 功率放电至 2.5V, 搁置 10 分钟并记录剩余能量(Wh), 搁置 10 分钟。 Rest at 25±2°C for 5h, discharge the cell with a power at 0.5P₁(W) to 2.5V, rest 10 minutes and record remaining energy . 4) 根据 3.17 将电池充满电 Full charge cell according to No. 3.17. 5) 将电池以 0.5P₁(W)功率放电至 2.5V, 并记录恢复能量(Wh)。 Discharge the cell with a power at 0.5P₁(W) to 2.5V and record recovery energy. | <p>无变形、膨胀、漏液 No apparent deformation and leak-out</p> <p>充电能量≥96.5%*初始充电能量 Charge energy≥96.5%* Initial charge energy</p> <p>放电能量≥96.5%*初始放电能量 Discharge energy≥96.5%* Initial discharge energy</p> |

5 Safety 安全性能

| NO. 序号 | Item 项目 | Testing method 测试过程 | Criteria 标准 |
|--------|-------------------|--|--|
| 5.1 | 过充电 Overcharge | <ol style="list-style-type: none"> 1) 测试温度: 25±2°C Test temperature: 25±2°C. 2) 根据 3.17 将电池充满电 | <p>无着火或爆炸 No fire or explosion</p> |

| | | | |
|-----|----------------------|---|---|
| | | <p>Full charge cell according to No. 3.17.</p> <p>3) 将电池以 $0.5I_1(A)$ 电流充电 1h 或者电压达到 5.475V. Charge the cell at $0.5I_1(A)$ for 1h or to 5.475V.</p> <p>4) 观察电池 1h. Observe the cell for 1h.</p> | |
| 5.2 | 过放电 Overdischarge | <p>1) 测试温度: $25\pm 2^\circ C$ Test temperature: $25\pm 2^\circ C$.</p> <p>2) 根据 3.18 将电池满放 Full discharge cell according to No. 3.18.</p> <p>3) 将电池以 $0.5I_1(A)$ 电流放电至电压达到 0V 或时间达到 90min Discharge the cell at $0.5I_1(A)$ to 0V or for 90min.</p> <p>4) 观察电池 1h Observe the cell for 1h.</p> | <p>无冒烟、着火、爆炸或者泄露 No smoke, fire, explosion or leakage</p> |
| 5.3 | 过载 Overload | <p>1) 测试温度: $25\pm 2^\circ C$ Test temperature: $25\pm 2^\circ C$.</p> <p>2) 将电池以 $0.5P_1(W)$ 放电至 2.5V, 并静置 10 分钟。 Discharge the cell with a power at $0.5P_1(W)$ to 2.5V and rest 10 minutes .</p> <p>3) 将电池以 $2P_1(W)$ 功率充电至 3.65V, 并静置 10 分钟。 Charge the cell with a power at $2P_1(W)$ to 3.65V and rest 10 minutes .</p> <p>4) 将电池以 $2P_1(W)$ 功率放电至 2.5V。 Discharge the cell at $2P_1(W)$ to 2.5V</p> <p>5) 观察电池 1h Observe the cell for 1h.</p> | <p>无冒烟、着火、爆炸或者泄露 No smoke, fire, explosion or leakage</p> |
| 5.4 | 短路 Short | <p>1) 测试温度 $25\pm 2^\circ C$ Test temperature: $25\pm 2^\circ C$.</p> <p>2) 根据 3.17 将电池充满电 Full charge cell according to No. 3.17.</p> <p>3) 用一个 (1 ± 0.2) mΩ 的电阻将正负极短路保持 10 分钟。 Use an $(1\pm 0.2)m\Omega$ resistance between the positive and negative terminals of cell for 10min.</p> <p>4) 观察 1 小时。 Observe the cell for 1h.</p> | <p>无着火或爆炸 No fire or explosion</p> |
| 5.5 | 跌落 Drop | <p>1) 根据 3.17 将电池充满电。 Full charge cell according to No. 3.17</p> <p>2) 将电池正负极端子向下从 1.5m 高度处自由跌落到水泥地面上。 Drop the cell (free drop) from 1.5 meters onto a hard flat surface, with terminal-side down.</p> <p>3) 观察电池 1h Observe the cell for 1h.</p> | <p>无冒烟、着火、爆炸或者泄露 No smoke, fire, explosion or leakage</p> |
| 5.6 | 挤压 Extrusion | <p>1) 测试温度 $25\pm 2^\circ C$ Test temperature: $25\pm 2^\circ C$.</p> <p>2) 根据 3.17 将电池充满电 Full charge cell according to No. 3.17.</p> | <p>无冒烟、着火、爆炸或者泄露 No smoke, fire, explosion or leakage</p> |

| | | | |
|------------|---|--|--|
| | | <p>3) 按下列条件测试:</p> <p>①挤压方向: 按图 1 所示施压;</p> <p>②挤压板: 半径为 75mm 的半圆柱体, 长度大于被挤压电池的尺寸;</p> <p>③挤压速度: (5±1)mm/s;</p> <p>④挤压程度: 电压达到 0V 或挤压力达到 (50±1) kN 时停止挤压;</p> <p>⑤保持 10 分钟</p> <p>①Extrusion orientation : according to Figure 1</p> <p>②Extrusion plate: a semi-cylinder with a radius of 75mm, longer than the extruded cell</p> <p>③Extrusion speed: (5±1)mm/s</p> <p>④Extrusion degree: Stop extrusion when the voltage reaches 0V or the extrusion force reaches (50 ± 1) kN</p> <p>⑤Keep state for 10 minutes</p> | |
| <p>5.7</p> | <p>热失控 Thermal runaway</p> | <p>1) 测试温度 25±2°C Test temperature: 25±2°C.</p> <p>2) 根据 3.17 将电池充满电。 Full charge cell according to No. 3.17.</p> <p>3) 用 0.5 I₁(A)恒流对电池充电, 同时按图 2 启动加热装置对电池持续加热。 Charge the cell with constant current at 0.5 I₁ (A) and start the heating device to continuously heat the cell according to Figure 2.</p> <p>4) 当发生热失控或监测点温度达到 300°C 或加热时间达到 4h, 停止充电并关闭加热装置; In case of thermal runaway or the temperature at the monitoring point reaches 300 °C or the heating time reaches 4h, stop charging and turn off the heating device.</p> <p>5) 观察 1h Observe the cell for 1h.</p> <p>6) 热失控判定条件: ① 电压≤1.0V ② 采样频率: 1s; 监测点连续三次温升速率≥ 3°C/s; ③ 当条件①和②同时满足, 电池判定为发生热失控 ①Voltage≤1.0V ②Sampling frequency: 1s; Temperature rise rate of monitoring point ≥ 3 °C/s for three consecutive times ③The battery is judged as thermal runaway when ① and ② occur simultaneously</p> | <p>无着火或爆炸 No fire or explosion</p> |
| <p>5.8</p> | <p>循环后热失控 Thermal runaway after cycle</p> | <p>1) 将循环后电池按照 5.7 进行热失控实验 Carry out the thermal runaway test of cell with cycling according to No. 5.7.</p> | <p>无着火或爆炸 No fire or explosion</p> |

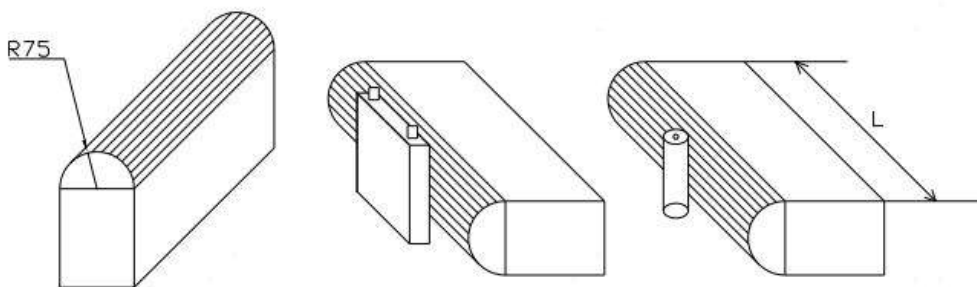


Fig 5.1 Extrusion

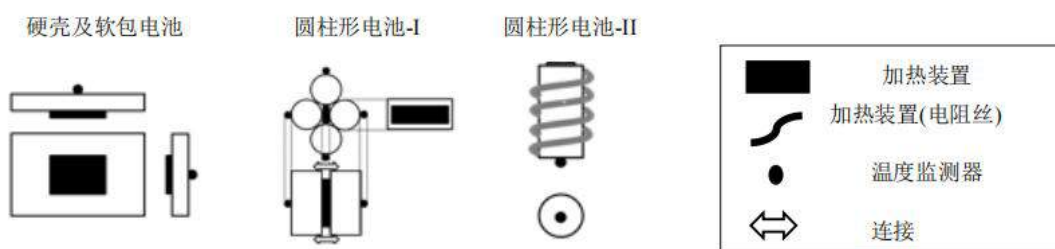


Fig 5.2 Thermal runaway

使用条件说明: 安全测试、寿命测试、系统成组设计需要施加预紧力，电芯的预紧力范围为1500N~5000N， 建议的预紧力控制公差为±200N。

Description of service conditions: safety test、 cycle life test and pack design need to add preload force, and the range of preload force of cell is 1500N~5000N, the recommended preload tolerance is ± 200N.

6 运输和存储 Battery Transportation and Storage

6.1 运输 Transportation

应根据运输的目的地和运输方式，选定合适的电池包包装方式。在运输过程中应防止剧烈振动、外力冲击或挤压，防止日晒雨淋，可使用车、火车、轮船、飞机等交通工具进行运输，在运输过程中应保持 10-30% 的电量。

Transport the battery in forms of package by truck, railway, ship or airplane. Severe vibration, impact, crush, exposure to the sun and rain during transportation should be avoided. The SOC of battery should be kept between 10-30%.

6.2 Storage 存储

电池应存储允许环境温度为-30~55℃，建议保存温度为-10~40℃，相对湿度为10%RH~90%RH的条件下。电池应避免与腐蚀性物质或磁性环境接触，电池存储在清洁、干燥、通风的环境中，远离火源及热源。电池不使用时，连续存放建议不超

过 3 个月。

Store the cell in a clean, dry, and well ventilated location with ambient temperature between $-30^{\circ}\text{C}\sim 60^{\circ}\text{C}$, better between -10°C and 40°C . And relative humidity of 10%RH ~90%RH. Keep away from corrosive materials and magnetic field, fire and heat sources. Do not upside down, crush and press. If battery is not in use, total storage time is not recommended for more than 3 months.

7 外形尺寸 Overall Dimensions

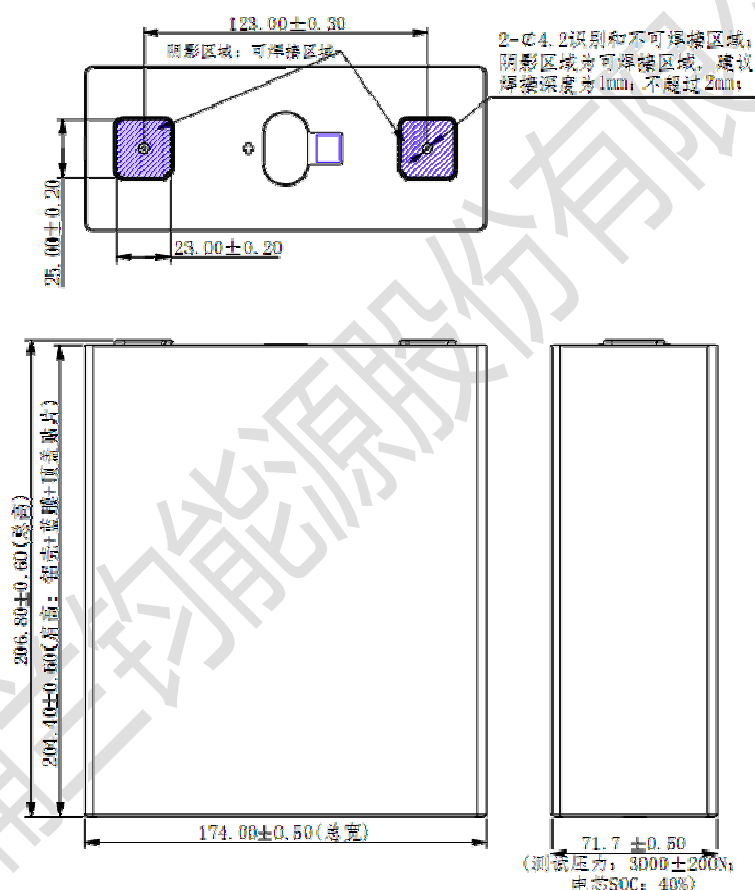


Figure 7 电池尺寸 /mm

8 质量保证 Quality Assurance

电池的保质期限依商务合同而定。在此期限内，如果非制造厂商的制程和品质原因，而是用户误用造成的电池问题，瑞浦兰钧能源股份有限公司可提供技术指导意见，不承诺免费更换服务。

The warranty period follows the contract. However, even though the problem occurs

within warranty period, REPT won't replace a new cell for free as long as the problem is not due to the failure of REPT's manufacturing/shipping process, but due to customer's misusage.

瑞浦兰钧能源股份有限公司对以下几种情况产生的问题及安全事故不承担任何责任。

REPT will not undertake responsibility under the following situations.

- 1) 违反安全使用指南所产生的问题及安全事故；

Issues and safety accidents caused due to the violation of safety instruction.

- 2) 出货后用户在电池组装过程中产生的不良电池；

Bad battery cell during assembling by customer after delivery.

- 3) 电池与电路、电池组和充电器搭配使用所产生的问题。

为了安全起见，如有配套设备设计、锂离子电池系统保护电路或大电流等其它方面的特殊应用，请先咨询瑞浦兰钧能源股份有限公司相关事宜。

Issues caused due to the connection of battery, circuit and battery charger.

For safety consideration, the customer should contact REPT in advance if other special applications are needed, especially equipment design, Li-ion cell system circuit protection, high current and so on.

9 安全使用指南 Safety Instructions

为避免滥用方形锂离子电池模块造成的电池损害或人身伤害，在使用方形锂离子电池之前，请认真阅读下面的安全指南：

Read the following advice carefully to ensure the right use of REPT Prismatic lithium ion module.



- 1) 电池非正确使用和存放，具有火灾、爆炸和烧伤的风险，勿将电池分解、压碎、焚化、加热和投入火中；

Risk of fire, explosion, and burns. Do not disassemble, crush, heat the cell or dispose it into fire;

- 2) 将电池置于儿童能接触的范围之外，使用之前不得将电池原包装移除，应根据当地的回收或废弃物法规及时处理废旧电池；

Keep the cell out of reach of children and don't remove the original package before

use. Dispose the used battery according to local recycling or waste disposition regulations;

- 3) 如需更换电池，应使用同一制造商生产的电池，使用其他制造商提供的电池可能存在起火和爆炸的风险；

Replace the battery manufactured by the same manufacture only. Mixed use of battery from other manufacture might cause fire and explosion;

- 4) 勿将电池投入水中或将其弄湿；

Do not throw the battery into water or make it wet;

- 5) 勿将电池正负极与金属壳体同时接触；

Do not connect positive and negatives with metal cover;

- 6) 勿将电池短路、过充或过放；

Do not make the cell short circuit, over-charge or over-discharge;

- 7) 勿在热源(如火或加热器)附近使用或贮存电池；

Do not use or store the cell near the heat source (such as fire or heater);

- 8) 勿将电池正负极接反；

Do not connect the position (+) and negative (-) terminals in the opposite way;

- 9) 勿将电池与硬币，金属饰品或其它金属物品放置在一起；

Do not put the battery together with coin, metal jewelry and other metal objects;

- 10) 勿用钉子或其它尖锐物体刺穿电池壳体，禁止锤击或脚踏电池；

Do not puncture the battery by nail or other sharp objects. Hammering and crush the battery is forbidden;

- 11) 勿直接焊接电池；

Do not weld the battery directly;

- 12) 勿擅自以任何方式拆卸或修整电池；

Do not disassemble or modify the battery in any way;

- 13) 勿撞击、投掷或者使电池受到机械震动及自然跌落；

Do not hit, throw or subject the battery to mechanical vibration and free fall;

- 14) 勿将不同种类、不同品牌的锂离子电池混合使用；

Mixed use of different types, brand of battery are forbidden;

15) 勿将负极柱与壳体(正电性)相连;

Do not connect the negative pole with the shell which is positive;

16) 如果电池发出异味、发热、变形、变色或出现其它任何异常现象时不得使用并将电池转移到安全的位置。

Stop use the battery and relocate the battery to a safe place it if battery gives off peculiar smell, temperature increase, deforms, color change or any other abnormal phenomena.

17) 如果电池泄漏, 电解质进入眼睛, 不要揉眼睛。用干净的自来水冲洗, 并立即就医;

If battery leaks, and electrolyte enters into eyes, do not rub. Rinse with clean running water, and seek medical assistance immediately;

18) 如果电池起火, 需用干粉、泡沫灭火器、沙子等熄灭并远离使用环境。

If battery catch fire, use dry powder, foam fire extinguisher or sand to extinguish flames and remove it from the operating environment;

10 出货状态 Shipment Status

客户若无特殊要求, 电池出厂时具有约 20-50%的电量。

The batteries should be shipped with 20%-50% SOC if customer has no special requirements.

11 制造商信息 Technical Consultant

制造商: 瑞浦兰钧能源股份有限公司

Manufacturer: REPT BATTERO Energy Co., Ltd.

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