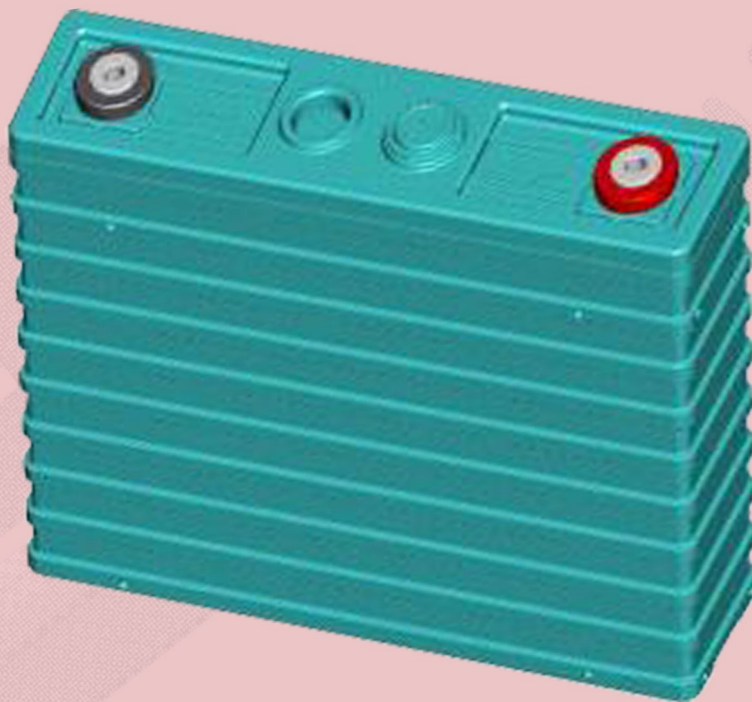


锂离子蓄电池规格书

Specification of Lithium-Ion Cell



蓄电池型号/Battery Type: GBS-LFP200Ah-B

浙江佳贝思绿色能源有限公司 / ZHEJIANG GBS ENERGY CO.,LTD.

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目录/ Contents

1. 前言/ Preface	3
2. 说明/ Description	3
3. 蓄电池尺寸/ Battery Size	3
4. 技术指标/ Specification	4
5. 性能测试/ Performance test	5
6. 安全测试/ Safety Test	8
7. 产品特点/ Product Performance	10
8. 使用注意事项/ Matters needing attention	11
9. 温馨提醒/ Safety notice	11

1. 前言/ Preface

本规格书规定了由浙江佳贝思绿色能源有限公司生产的GBS-LFP200Ah-B锂离子蓄电池（以下简称蓄电池）的相关技术指标及注意事项。

This specification describes the technique requirements, test procedure and precaution notes of LiFePO₄ type Lithium-ion Rechargeable cell to be supplied to customer by Zhejiang GBS Energy Co., Ltd.

2. 说明/ Description

2.1 产品名称/ Product: 锂离子蓄电池/ Lithium-Ion Rechargeable cell

2.2 产品型号/ Model (Type): GBS-LFP200Ah-B

2.3 命名方法/ Designation: GBS - LFP 200Ah -B

① ② ③ ④

2.3.1: ① 表示蓄电池生产厂家/ Indicates the manufacturer

"GBS" 表示蓄电池生产厂家为浙江佳贝思绿色能源有限公司。

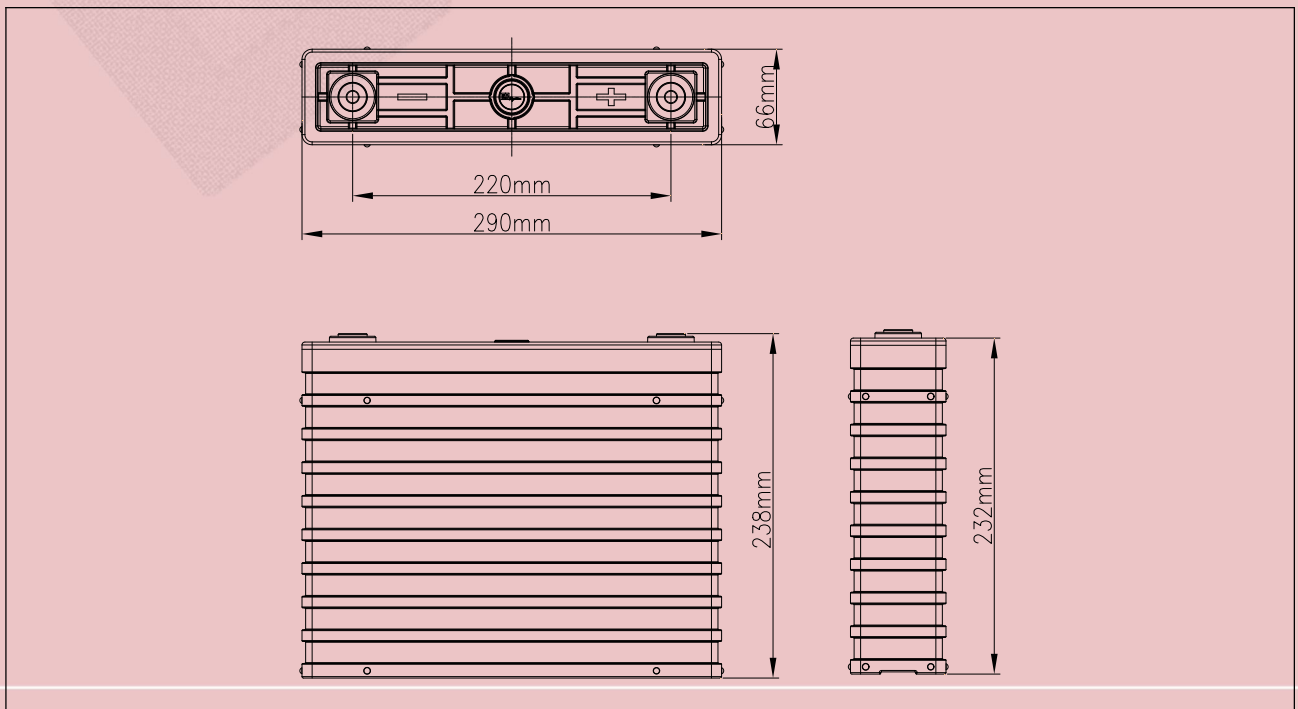
2.3.2: ② 表示蓄电池的材料/ Indicates the material of battery

2.3.3: ③ 表示蓄电池的容量/ Indicates the capacity of battery

2.3.4: ④ 表示蓄电池序列号/ Indicates the serial number of battery

3. 蓄电池尺寸/ Battery Size

Item	Description	Dimensions
L	Length (长度)	290mm
W	Width (宽度)	66mm
H	Height (高度)	238mm



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4. 技术指标/Specification

项目/ Item		标准/ Specification	备注/Remark
4.1	标称容量/ Rated capacity	200Ah	0.33C rate discharge capacity
4.2	最小容量/ Minimum capacity	200Ah	
4.3	交流内阻/ Internal impedance	≤0.6mΩ	
4.4	标称电压/ Nominal voltage	3.2V	
4.5	重量/ weight	6.5±0.1KG	
4.6	标准放电方式 Standard discharge conditions	恒流/ Constant current 100A	
		截止电压 End-of-charge voltage 2.8V	
4.7	标准充电方式 Standard charge method	恒流/ Constant current 50A	
		充电电压 Charge voltage 3.65V	
4.8	快速充电方式 Fast charge method	恒流/ Constant current 200A	
		充电电压 Charge voltage 3.65V	
4.9	最大持续放电电流 Max continuous discharge current	600A	
4.10	脉冲放电电流/ Pulse discharge current at 10 sec	2000 A	
4.11	自放电/Self-discharge	≤3% per month	
4.12	循环寿命 Cycle life	2000 cycles	80% DOD(25±2℃)
4.13	操作温度 Operating temperature	充电温度 Charging ambient temperature	0~45℃
		放电温度 Discharging ambient temperature	-20~65℃
		存储温度 Storage temperature	-20~65℃
4.14	外观/ Appearance	无破裂、变形、污迹、 电解液泄露等 Without break, distortion, contamination, leakage.	

5. 性能测试/ Performance test

标准测试条件/ Standard test conditions:

若无特别要求, 此规格书上默认的产品测试条件为: 环境温度 $23\pm 2^{\circ}\text{C}$, 湿度 $65\pm 10\%$ RH.

Unless otherwise specified, all tests stated in this Product Specification are conducted at temperature $23\pm 2^{\circ}\text{C}$ and humidity $65\pm 10\%$ RH.

测试项目/ Test Item	要求/Demand	结论/Conclusion
外观 Appearance	外观不得有变形及裂纹, 表面应平整、干燥、无外伤、无污物等, 且标志清晰。 Intact in shape, no deformation, no crack, no breakage, dry and clean, with clear sign.	外观没有变形及裂纹, 表面平整、干燥、无外伤、无污物, 标志清晰。 Intact in shape, no deformation, no crack, no breakage, dry and clean, with clear sign.
极性 Polarity	端子极性应正确, 并应有正负极的清晰标识。 Correct polarity on terminals. Clear sign on cathode and anode.	端子极性正确。有正负极的清晰标识。 Correct polarity on terminals. Clear sign on cathode and anode.
外型尺寸 Dimension	长×宽×高: $290 \times 66 \times 237\text{mm}$ L × W × H: $290 \times 66 \times 237\text{mm}$	实际尺寸为 $290 \times 66 \times 237\text{mm}$
重量 Weight	$6.5\pm 0.15\text{KG}$	重量为 6.5KG
20 °C 放电性能 Discharge performance at 20 °C	蓄电池在 $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$ 下以 $1\text{I}_3(\text{A})$ 电流放电, 直到放电终止电压 2.7V。放电容量不低于额定容量, 且不高于额定容量的 110%。 Discharge with current $1\text{I}_3(\text{A})$ at $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$, till discharge voltage reaches 2.7V. Discharge capacity should be no less than rating capacity and no more than 110% rating capacity.	放电容量不低于额定容量, 且不高于额定容量的 110%。 Discharge capacity is no less than rating capacity and no more than 110% rating capacity.
-20 °C 放电性能 Discharge performance at -20 °C	蓄电池充电后在环境温度 $-20^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 下贮存 20h。然后在同一温度下, 以 $1\text{I}_3(\text{A})$ 电流放电, 直到放电终止电压 2.0V。放电容量不低于额定容量的 70%。 Store at $-20^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for 20h after full charge. Discharge with current $1\text{I}_3(\text{A})$ under the same temperature, till discharge voltage reaches 2.0V. Discharge capacity should be no less than 70% rating capacity.	放电容量不低于额定容量的 70%。 Discharge capacity is no less than 70% rating capacity.
55 °C 放电性能 Discharge performance at 55 °C	蓄电池充电后, 在环境温度 $55^{\circ}\text{C}\pm 2^{\circ}\text{C}$ 下贮存 5h。然后在同一温度下, 以 $1\text{I}_3(\text{A})$ 电流放电, 直到放电终止压 2.7V。放电容量不低于额定容量的 95%。 Store at $55^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for 5h after full charge. Discharge with current $1\text{I}_3(\text{A})$ under the same temperature, till discharge voltage reaches 2.7V. Discharge capacity should be no less than 95% rating capacity.	放电容量不低于额定容量的 95%。 Discharge capacity is no less than 95% rating capacity.

测试项目/ Test Item	要求/Demand	结论/Conclusion
<p>20℃倍率放电性能 Rate Discharge performance at 20℃</p>	<p>蓄电池充电后在 20℃±5℃下，以 4.5I₃(A)电流放电，直到放电终止电压 2.7V。放电容量不低于额定容量的 80%。 Discharge with current 4.5I₃(A) at 20℃±5℃ after full charge, till discharge voltage reaches 2.7V. Discharge capacity should be no less than 80% rating capacity.</p>	<p>放电容量不低于额定容量的 80%。 Discharge capacity is no less than 80% rating capacity.</p>
<p>常温荷电保持及恢复能力 Holding and recovery performance at ambient temperature</p>	<p>蓄电池充电后在 20℃±5℃下贮存 28 天。然后在 20℃±5℃下，以 1I₃(A)电流放电，直到放电终止电压 2.7V。然后充电，然后在 20℃±5℃下，以 1I₃(A)电流放电，直到放电终止电压 2.7V。保持能力不低于额定容量的 80%，恢复能力不低于额定容量 90%。 Store at 20℃±5℃ for 28 days after full charge. Discharge with current 1I₃(A) at 20℃±5℃, till discharge voltage reaches 2.7V. Charge again. Then discharge with current 1I₃(A) at 20℃±5℃, till discharge voltage reaches 2.7V. Holding Performance should be no less than 80%, of rating capacity and recovery performance should be no less than 90% rating capacity.</p>	<p>保持能力不低于额定容量的 80%，恢复能力不低于额定容量 90%。 Performance is no less than 80%, of rating capacity and recovery performance is no less than 90% rating capacity.</p>
<p>高温荷电保持及恢复能力 holding and recovery performance at high temperature</p>	<p>蓄电池充电后，在 55℃±2℃下贮存 7 天。然后在 20℃±5℃下恢复 5h 后，以 1I₃(A)电流放电，直到放电终止电压 2.7V。然后充电，然后在 20℃±5℃下，以 1I₃(A)电流放电，直到放电终止电压 2.7V。保持能力不低于额定容量的 80%，恢复能力不低于额定容量 90%。 Store at 55℃±2℃ for 7 days after full charge. Keep at 20℃±5℃ for 5h to recover, then discharge with current 1I₃(A), till discharge voltage reaches 2.7V. Charge again. Then discharge with current 1I₃(A) at 20℃±5℃, till discharge voltage reaches 2.7V. Holding performance should be no less than 80% rating capacity. Recovering performance should be no less than 90% rating capacity.</p>	<p>保持能力不低于额定容量的 80%，恢复能力不低于额定容量 90%。 Holding performance is no less than 80% rating capacity. Recovering performance is no less than 90% rating capacity.</p>

测试项目/ Test Item	要求/Demand	结论/Conclusion
<p>贮存 Storage</p>	<p>蓄电池充满电后，在 20°C±5°C 下，以 1I₃(A) 电流放电 2h。然后在 20°C±5°C 下贮存 90 天。然后在 20°C±5°C 下，以 1I₃(A) 电流充电至 3.65V，然后以 3.65V 恒压充电，至电流降为 0.1I₃。然后以 1I₃(A) 电流放电，直到放电终止电压 2.7V。放电容量不低于额定容量的 95%。</p> <p>After full charge, discharge with current 1I₃(A) at 20°C±5°C for 2h . Store at 20°C±5°C for 90 days. Then charge with current 1I₃(A) at 20°C±5°C, till the voltage reaches 3.65V. Continue to charge with CV 3.65v, till the current reduces to 0.1I₃. Then discharge with current 1I₃(A) until discharge voltage reaches 2.7V. Discharge capacity should be no less than 95% rated capacity.</p>	<p>放电容量不低于额定容量的 95%。 Discharge capacity is no less than 95% rated capacity.</p>

6. 安全测试/ Safety test

下述试验应在有强制排风条件及防爆措施的装置内进行,所有的蓄电池按标准充电方式充电完成并搁置24h后,再进行以下试验。

All below tests are carried out on the equipments with forced ventilation and explosion-proof device. Before test all cells are charged using standard charge method, and stored 24h prior to testing.

测试项目/ Test Item	要求/Demand	结论/Conclusion
过放电试验 Over discharge test	<p>蓄电池充电后在 20°C±5°C 下, 以 1I₃(A) 电流放电, 直至蓄电池电压 0V。蓄电池应不爆炸、不超火、不漏液。</p> <p>After full charge, discharge with current 1I₃(A) at 20°C±5°C, till voltage reaches 0V. There should be no explosion, no fire, no leakage.</p>	<p>蓄电池未爆炸、未超火、未漏液。</p> <p>No explosion, no fire, no leakage</p>
过充电试验 Overcharge test	<p>蓄电池充电后, 以 3I₃(A) 电流充电, 至蓄电池电压达到 5V 或充电时间达到 90min(其中任意一个条件达到即停止试验), 蓄电池应不爆炸、不超火。</p> <p>After full charge, charge with current 3I₃(A), till voltage reaches 5V or charging time reaches 90min (Once any of these two points reaches first, cease the test). There should be no explosion, no fire.</p>	<p>蓄电池未爆炸、未超火。</p> <p>No explosion, no fire.</p>
短路试验 Short circuit test	<p>充电后, 将蓄电池外部短路 10min (外部线路电阻应小于 5mΩ)。蓄电池应不爆炸、不超火。</p> <p>After full charge, make the battery short circuit from outside for 10min. Inherent resistance of external circuit should be less than 5mΩ. There should be no explosion, no fire.</p>	<p>蓄电池未爆炸、未超火。</p> <p>No explosion, no fire.</p>
跌落试验 Falling test	<p>蓄电池充电后在 20°C±5°C 下, 从 1.5m 高度处自由跌落到厚度为 20mm 的硬木地板上, 蓄电池每个面朝下跌落 1 次。蓄电池应不爆炸、不超火、不漏液。</p> <p>After full charge, let the battery fall from 1.5m height to the hardwood plate of 20mm thickness at 20°C±5°C. Do the test once on each side. There should be no explosion, no fire, no leakage.</p>	<p>蓄电池未爆炸、未超火、未漏液。</p> <p>No explosion, no fire, no leakage.</p>
加热试验 Heating test	<p>充电后, 将蓄电池置于 85°C±2°C 恒温箱内 120min。蓄电池应不爆炸、不超火。</p> <p>After full charge, keep the battery in the thermostated container at 85°C±2°C for 120min. During the test, there should be no explosion, no fire.</p>	<p>蓄电池未爆炸、未超火。</p> <p>No explosion, no fire.</p>

测试项目/ Test Item	要求/Demand	结论/Conclusion
<p>挤压试验 Crush test</p>	<p>按下列条件进行挤压试验，蓄电池应不爆炸、不起火。 a>挤压方向：垂直于蓄电池极板方向施压。 b>挤压头面积：不小于 20cm²。 c>挤压程度：直至蓄电池壳体破裂或内部短路(蓄电池电压变为 0V)。 Test according to below condition. There should be no explosion, no fire. a>crush direction: Crush perpendicular to battery's pole plate. b>Area of crush point: no less than 20cm². c>Crush extent: crush till the shell broken or short circuit inside (voltage becomes 0V).</p>	<p>蓄电池未爆炸、未起火。 No explosion, no fire.</p>
<p>针刺试验 Penetration test</p>	<p>充电后，用φ3mm~φ8mm 的耐高温钢针以 10~40mm/s 的速度，从垂直于蓄电池极板的方向贯穿，钢针停留在蓄电池中。蓄电池应不爆炸、不起火。 After full charge, using φ3mm~φ8mm heat-resistant steel needle, penetrate at least 3 pcs of single cell with the speed of 10-40mm/s in the direction perpendicular to pole plate of batteries (keep the steel needle inside the batteries). During the test, there should be no explosion, no fire.</p>	<p>蓄电池未爆炸、未起火。 No explosion, no fire.</p>
<p>循环寿命 Cycle life</p>	<p>蓄电池充满电后，在 20℃±2℃下，以 0.5C₃(A)电流放电至电压 2.7V，再以 0.5C₃ 电流充电至 3.65V，然后以 3.65V 恒压充电，至电流降为 0.1I₃。蓄电池按上述步骤连续重复 500 次。检查容量，蓄电池容量不小于额定容量的 80%。 After full charge, discharge with current 0.5C₃(A) at 20℃±2℃ till voltage reaches 2.7V. Then charge with current 0.5C₃ to 3.65V and then charge with constant voltage 3.65V till the current reduces to 0.1I₃. Repeat the above steps for 500 times. Check the capacity. It is no less than 80% of rated capacity.</p>	<p>蓄电池容量不小于额定容量的 80%。 Capacity is no less than 80% rated capacity.</p>

7. 产品特点/ Basic Performance

- (1) 高效率输出：标准放电为 0.3C-0.8C，瞬间脉冲放电（10s）可达 10C。

Output with high efficiency: Standard discharge current is 0.3C-0.8C, instant impulse discharge current is 10C for 10 seconds.

- (2) 高温性能良好：可以在外部环境温度 65℃ 下工作，而且蓄电池结构保持完好。

Good performance under high temperature, it could work under 65℃ temperature. The battery structure is safe and good.

- (3) 低温性能良好：外部环境温度 0℃ 时放电容量不低于额定容量的 90%，-20℃ 时放电容量不低于额定容量的 70%。

Good performance under low temperature. discharge capacity decreases to over 90% under 0℃ and discharge capacity decreases to over 70% under -20℃.

- (4) 安全性能好，蓄电池上盖装有双安全阀，一个是可控式单向安全阀，该安全阀的出气压力可进行调节，蓄电池使用过程中可以将气体排出，提高蓄电池的使用性能；另一个是防爆安全阀，当蓄电池内部或外部受到破坏时，防爆安全阀将瞬间弹开，释放气体压力和热量，从而保证蓄电池不会燃烧、爆炸。其中可控式单向安全阀已申请发明专利。

Good safety performance, fits with controlled safety valve on top of battery. The released air pressure of safety valve is adjustable. The gas could be released during using and improve battery performance. When the battery internal or external is damaged, the safety valve could be flicked, and release the air pressure and heat, so the battery won't explode or burn. The product has already applied for invention patent.

- (5) 循环寿命高：单体蓄电池经 2000 次循环充放电（80%DOD）后，其放电容量仍大于额定容量的 80%。

Good cycle life time, the discharge capacity is still over 80% after 2000 cycle times of single cell (80%DOD).

- (6) 可快速充电：0.5 小时可充至额定容量的 80%，2-3 小时可充满。

It can fast charging. It could be charged to 80% within 0.5h and charged full with 2-3h.

- (7) 绿色环保：生产和使用对环境无污染。

No pollution during manufacture and usage.

8. 使用注意事项 Matters needing attention

- (1) 打开包装箱后请检查相应配件是否齐全，并仔细阅读说明书。

Please check if spare parts are completed when open the package and read the operation manual carefully.

- (2) 不得将蓄电池短路，不得将蓄电池过充过放。

Do not make the battery Short Circuit,do not over charge and discharge.

- (3) 新出厂的蓄电池，首次使用前应先将电充满，然后再使用。

Please charge the new battery to full capacity before discharge for the first use.

- (4) 出厂的蓄电池模块均用夹板夹紧，切勿将夹板拆除。

The battery pack is fixed with plate and strip before delivery, do not disassemble the plate and strip when using the battery.

- (5) 蓄电池出厂时的电压，一般为 3.2V~3.4V。

Checking the voltage of battery, normally it is 3.2V~3.4V.

- (6) 为蓄电池模块安装相应的 BMS，可以保护蓄电池，避免由于过充电或过放电而对蓄电池造成损坏。

Fix BMS for battery pack and protect single cell to avoid over charge and over-discharge.

- (7) 蓄电池的极柱与导电条之间用铆钉或螺钉固定。

Rivet or screw is used for battery connector.

- (8) 蓄电池模块与蓄电池模块之间，用两端带铜鼻子的连接线进行连接，铜鼻子与连接线之间应该用液压钳紧固。

如用户需要，本公司可提供相应的专用连接条（采用螺钉固定）。

Please use copper part to connect battery packs and fix with hydraulic pressure plier. We could also provide the relevant connection which fixed with screws.

- (9) 充电器应采用本公司认可的产品，以与我公司的蓄电池进行较好的匹配。

The charger used should be approved by our company in order to match with our lithium batteries.

- (10) 若不按上述要求操作，则有可能出现蓄电池使用寿命减短、蓄电池过充过放等问题，导致蓄电池损坏。对此，请恕本公司概不负责。

It will shorten battery cycle lifetime and damage battery due to overcharge and over-discharge if not do according to the above . It won't be within our company warranty.

9. 温馨提醒/ Requirement for safety assurance

尊敬的客户，为了您能更好的使用我们的产品,如您遇到蓄电池箱体设计、蓄电池管理系统方案设计等其它方面的问题,请与我们一起进行探讨，我们将竭诚为您服务。

服务热线：+86-574-58122555

For the sake of safety assurance, please discuss the equipment design, its system and protection circuit of Lithium-ion cell advance. And consult about the high rate current, rapid charge and special application in the same way.

Service line: +86-574-58122555