受控

锂离子电芯产品规格书

Lithium-ion Battery Product Specification

电芯型号：CBA54173200-206Ah

Cell Model：CBA54173200-206Ah

研发 RD	工艺 PE	品质 QA	销售 AE

	签名 Signature	日期 Date
客户承认 Customer Approval		
	公司名称 Company name：	
	公司盖章 Company stamp：	

目 录

前　言 Preface

本标准为公司统一执行的企业标准。

This standard is the enterprise standard that the company carries out uniformly.

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。

The format of this standard conforms to GB/T 1.1-2009 *Standardization Guidelines Part 1: Structure and Compilation of Standards*.

本标准在参照 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》，GB/T 31486-2015《电动汽车用动力蓄电池电性能要求及试验方法》及 GB/T 34014-2017《汽车动力蓄电池编码规则》的基础上，结合我司产品实际和试验条件，特制定《CBA54173200-206Ah 锂离子电芯产品规格书》标准，并对试验方法、判定标准进行了修订和补充，以指导 CBA54173200-206Ah 锂离子电芯产品的制造和验收。

Based on GB/T 31484-2015 *Cycle life requirements and test methods for traction battery of electric vehicle*, GB 38031-2020 *Safety requirements for traction battery of electric vehicles*, GB/T 31486-2015 *Electrical performance requirements and test methods for traction battery of electric vehicle*, and GB/T 34014-2017 *Coding regulation for automotive traction battery*, combined with the actual product and test conditions of our company, the *CBA54173200-206Ah Lithium -ion Cell Product Specification* is specially formulated, and the test method and judgment standard are revised and supplemented so as to guide the manufacture and acceptance of CBA54173200-206Ah cell.

本标准由电芯研发部提出并起草。

This standard was proposed and drafted by Cell R&D Department.

本标准主要起草人：别永合　　修正人：　周灿

Mainly developed by: Yonghe Bie　　Reviewed by: Can Zhou

修订记录 Revision history

版本号 Rev. no	变更内容 change content	修订日期 date	修订者 by
A/0	首次发布 First release	2021/1/11	魏思伟 Siwei Wei
A/1	增加电池使用警示要求 Add warning requirements of battery use	2021/5/6	周灿 Can Zhou
A/2	删除旧标准 GB/T 31485-2015 Delete old standards GB/T 31485-2015	2021/12/30	别永合 Yonghe Bie
A/3	调整格式 Adjust the format	2022/06/15	别永合 Yonghe Bie

1 适用范围 Scope of Application

本产品规格书规定了山东德晋新能源科技有限公司（以下均简写为 DJENERGY）生产的 CBA54173200-206Ah 锂离子电芯的性能要求、试验方法、检验规则、标志、贮存和安全要求。

This product specification regulates the performance requirements, test methods, inspection rules, storage and safety requirements of CBA54173200-206Ah lithium-ion cell produced by Shandong Dejin New Energy Science and Technology Co., Ltd. (hereafter refer to as "DJENERGY").

2 规范性引用文件 Normative Reference

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

Provisions in the following documents are partly quoted as part of the standard. The latest version of undated reference documents is applicable to this standard.

GB/T 2900.41-2008 《电工术语原电芯和蓄电芯》

GB/T 2900.41-2008 *Electrotechnical terminology primary and secondary cells and batteries*

GB/T 34014-2017 《汽车动力蓄电池编码规则》

GB/T 34014-2017 *Coding regulation for automotive traction battery*

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

GB 38031-2020 《电动汽车用动力蓄电池安全要求》

GB 38031-2020 *Safety requirements for traction battery of electric vehicles*

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 31486-2015 *Electrical performance requirements and test methods for traction battery of electric vehicle*

3 术语和定义 Terms and Definitions

3.1 产品：本规格书中的产品是指 DJENERGY 生产的 206Ah 3.2V 可充电磷酸铁锂电芯；

3.1 Products: The products in this specification refer to the 206Ah 3.2V rechargeable lithium iron phosphate cells produced by DJENERGY.

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；

3.2 Customer: Customer refers to the company, enterprise or individual that purchases the products mentioned in this specification.

3.3 电芯：实现化学能和电能相互转化的基本单元；

3.3 Cell: the basic unit to realize the mutual conversion of chemical energy and electric energy;

3.4 标称电压：标志或识别一种电芯或一种电化学体系的适当的电压近似值；

3.4 Nominal voltage: Marking or identifies an appropriate approximation of the voltage for a cell or an electrochemical system;

3.5 额定充电或放电电流：在规定试验条件和试验方法下，电芯可持续工作一定时间的充电或放电电流；

3.5 Rated charging or discharging current: The charging or discharging current of the cell can work continuously for a certain period of time under the specified test conditions and

methods;

3.6 标称容量：在规定试验条件和试验方法下，标准充电后的电池以额定放电电流放电至放电终止电压时的放电容量；

3.6 Nominal capacity: The discharge capacity of standard charged cell from rated discharge current to discharge termination voltage under specified test conditions and methods;

3.7 能量密度：在规定试验条件和试验方法下，电池的放电能量与电池的重量或者体积的比值；

3.7 Energy density: The ratio of the discharge energy of the cell to the weight or volume of the cell under the specified test conditions and methods;

3.8 壳体：将电芯内部部件封装并防止与外部直接接触的保护部件，是电芯的容器；

3.8 Shell: The protective component that encapsulates the inner parts of the cell and prevents direct contact with the outside is the container of the cell;

3.9 起火：电芯任何部位发生持续时间大于 1s 的燃烧，火花及拉弧不属于燃烧；

3.9 Ignition: Any part of the cell burns for longer than 1s, and sparks and arcs do not belong to combustion;

3.10 爆炸：突然释放足量的能量产生压力波或者喷射物，可能会对周边区域造成结构或物理上的破坏；

3.10 Explosion: Sudden release of sufficient energy to generate pressure waves or ejections may cause structural or physical damage to the surrounding area;

3.11 漏液：电池内部液体泄漏到壳体外部；

3.11 Leakage: The liquid inside the cell leaks to the outside of the shell;

3.12 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 小时率充放电时的电流；

3.12 Rate current: Abbreviated symbol C, 1C denotes the current of the cell charged and discharged at 1 hour rate, 2C denotes the current of the cell charged and discharged at 1/2 hour rate;

3.13 交流内阻：电芯在室温条件下，用交流内阻测试仪以 1KHZ 50mA 条件测试的内阻结果；

3.13 AC internal resistance: The internal resistance of the cell was measured by AC internal resistance tester with 1KHZ 50mA at room temperature;

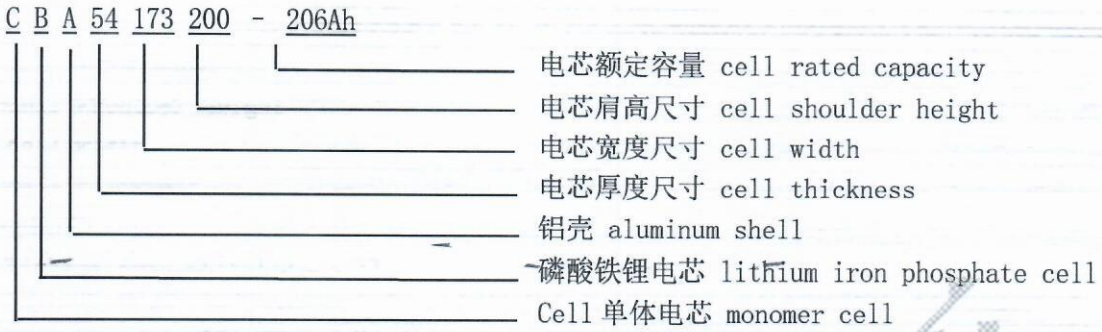
3.14 循环：电池按规定的充放标准充放一次为一个循环。充电可以由一些部分充电组合在一起形成。放电可以由一些部分放电组合在一起形成。

3.14 Cycle: Means a state when a total of charge and discharge according to rules from a cell asrecorded by BMS and it may consist of a summation of a few segments of partial charges and discharges.

3.15 新电芯：是指客户收货的 7 天以内的状态（仅限国内运输）。

3.15 Fresh cell: Means the state within 7 days after customer received the product (domestic only)

3.16 型号含义 Model meaning:



4 基本性能 Basic Performance

表 1 基本性能

Table 1 Basic performance

序号 S.N.	参 数 Parameter	产品规格 Specification	条 件 Condition
4.1	外观 External appearance	无破裂、划痕、变形、污渍、电解液泄漏等 No breakage, scratch, deformation, stain, electrolyte leakage, etc.	N/A
4.2	尺寸 Size	54mm*173mm*200mm	详细见附录 13 See Appendix 13 in detail
4.3	额定电流 Rated current	0.5C	103A
4.4	标称容量 Nominal capacity	206Ah	标准充放电 Nominal charge and discharge
4.5	标称电压 Nominal voltage	3.2V	25±2 ℃
4.6	重量 Weight	3900g±120g	N/A
4.7	最高充电电压 Maximum charging voltage	3.65V	0℃≤T≤60℃
4.8	最低放电电压 Minimum discharge voltage	2.5V	0℃＜T≤60℃
		2.0V	-20℃≤T≤0℃
4.9	能量密度 Energy density	≥164Wh/kg	质量能量密度 Mass energy density
		≥350Wh/L	体积能量密度 Volume energy density
4.10	交流内阻 AC internalresistance	＜0.3mΩ	新电芯 Fresh cell
4.11	出货容量	93±1Ah	45% SOC

	Shipping capacity		
4.12	月自放电 self-discharge	≤3.5%/月 Per month ≤3.5%	标准充电到 45%SOC，25±2℃储存 Standard charging to 45% SOC, 25±2 ℃storage
4.13	静置 SOC Rest SOC	≥5%	无负载或充电时的 SOC 区间 SOC interval without load or charging
4.14	应用海拔 Altitude	≤2000m	N/A
4.15	储存温度 Storage temperature	-20~45℃ 1 个月以内 (within 1 month) -20~35 ℃ 6 个月以内 (within 6 months)	储存环境湿度≤85%RH Storage environment humidity≤85%RH SOC：20~50%SOC
4.16	循环衰减 Cycle fading	≤5%	25±2℃初始夹紧力 300±30Kgf，1C 充放电测试循环 180 圈。 25±2℃, cycle test by 1C charge and discharge method under 300±30Kgf preload for 180 cycles.
4.17	储存衰减 Storage fading	≤5%	25±2℃初始夹紧力 300±30Kgf，标准充电至 100%SOC 存储 6 个月。 25±2℃, initial clamping force 300 ±30kgf, standard charge to 100% SOC for 6 months.

5 电性能 Electrical Performance

5.1 测试条件 Test Condition

除另有规定外，试验应在温度为 25℃±2℃，相对湿度为 15%RH~90%RH，大气压力为 86kPa~106kPa 的环境中进行。本规格书提到的室温是指 25℃±2℃。

Except as otherwise specified, the test shall be carried out in an environment of 25±2℃, 15%RH~ 90%RH and 86kPa~106kPa atmospheric pressure. The room temperature mentioned in this specification refers to 25±2℃.

5.2 测试仪表与设备要求 Testing Instruments and Equipment Requirements

—电压测量装置：不低于 0.5 级

-Voltage measuring device: no less than 0.5 grade

—电流测量装置：不低于 0.5 级

-Current measuring device: no less than 0.5 grade

—温度测量装置：±0.5℃

-Temperature measuring device: ±0.5℃

—时间测量装置：±0.1%

-Time measuring device: ±0.1%

—尺寸测量装置：±0.1%

-Dimension measuring device: ±0.1%

—质量测量装置：±0.1%

-Mass measuring device: ±0.1%

5.3 电性能指标及测试方法 Electrical Performance Indicators and Test Methods

表 2 电性能指标及测试方法

Table 2 Electrical performance indicators and test methods

序号 S.N.	项目 Item	技术要求 Technical requirement	测试方法 Test methods
5.3.1	标准充电 Standard charge	/	25±2℃，初始夹紧力 300±30Kgf，电芯以 0.5C(A)恒流充电至 3.65V，3.65V 恒压充电至电流下降到 0.05C(A)。 25±2℃, the initial clamping force is 300 ± 30kgf, the cell is charged to 3.65V at 0.5C (A) constant current and 3.65V constant voltage until the current drops to 0.05C(A)
5.3.2	绝对充电温度（电芯温度） Absolute charging temperature (cell temperature)	0~60℃	无论电芯处在何种充电模式，一旦发现电芯温度超过绝对充电温度范围即停止充电。 No matter what charge mode the battery is in, stop charging once the cell temperature exceeds absolute charging temperature range
5.3.3	绝对充电电压 Absolute charging voltage	最大 3.65V Max 3.65V	无论电芯处在何种充电模式，一旦发现电芯电压超过绝对充电电压范围即停止充电。 No matter what charge mode the battery is in, stop charging once the cell voltage exceeds absolute charging voltage.
5.3.4	标准放电 Standard discharge	/	25±2℃，初始夹紧力 300±30Kgf，电芯以 0.5C(A)恒流放电至 2.5V。 25±2℃, the initial clamping force is 300 ± 30kgf, the cell is discharged at a constant current of 0.5C (A) to 2.5V.
5.3.5	绝对放电温度 Absolute discharge temperature	-20~60℃	无论电芯处在持续放电模式或脉冲放电模式，若电芯温度超过绝对放电温度，则停止放电。 Stop discharging once cell temperature is outside this range regardless of whether continuous or pulse current is adopted.
5.3.6	标称容量 Nominal capacity	206Ah	25±2℃，电芯标准充电后搁置 30min，然后进行标准放电。如果放电容量达不到标称容量，此项试验允许重复 5 次，取最后 3 次结果的平均值。 25±2℃, after standard charging of the cell, put the cell aside for 30minutes. Then the standard discharging is performed. If the discharge capacity does not reach the rated capacity, the test is allowed to be repeated five times, taking the average of the last three results.
5.3.7	高温放电容量 High temperature discharge capacity	≥95%	a）电芯进行标准充电； Standard charging of the cell. b）在 55℃±2℃条件下搁置 5h； Put aside for 5hrs at 55℃±2℃. c）在 55℃±2℃条件下放电至 2.5V（放电电流参考 5.6.1）； Discharge to 2.5V at 55℃±2℃ (discharge current

			refer to 5.6.1). d）计算放电容量与标称容量的比值。 Calculate the ratio of discharge capacity to nominal capacity.
5.3.8	低温放电容量 Low temperature discharge capacity	0℃≥90% -10℃≥85% -20℃≥80%	a）电芯进行标准充电； Standard charging of the cell. b）在目标低温条件下(温度波动±2℃)搁置 24h； Shelving for 24hrs at target low temperature (temperature fluctuation (±2℃). c）在目标低温条件下 1C 放电至截止电压（放电截止电压参考 4.8）； Discharge at 1C current to cut-off voltage at target low temperature (refer to 4.8 for discharge cut-off voltage) d）计算放电容量与标称容量的比值。 Calculate the ratio of discharge capacity to nominal capacity.
5.3.9	室温荷电保持与容量恢复能力 Charge retention and capacity recovery at room temperature	荷电保持≥94% Capacity retention≥94% 容量恢复≥96% Capacity recovery ≥96%	a)电芯标准充电； Cell standard charging. b）在室温下储存 28 天； Store at room temperature for 28days. c)电芯进行标准放电，计算荷电保持能力； The standard discharge of the cell is carried out to calculate the charge retention capacity. d）电芯再进行标准充电并搁置 1h； Standard charging of the cell and shelving for 1hr. e）电芯进行标准放电，计算容量恢复能力。 Calculate the capacity recovery capability of the cell by standard discharge.
5.3.10	高温荷电保持与容量恢复能力 Charge retention and capacity recovery at high temperature	荷电保持≥92% Capacity retention≥92% 容量恢复≥95% Capacity recovery ≥95%	a）电芯标准充电； Cell standard charging; b）电芯在55℃±2℃条件下储存7天； The cell were stored at 55±2℃ for 7days; c）电芯在室温下搁置5h后进行标准放电，计算荷电保持能力； The standard discharge of the cell is carried out after it is shelved at room temperature for 5hrs, and the capacity retention capability is calculated. d）电芯再进行标准充电并搁置1h； Standard charging of the cell and shelving for 1hrs. e）电芯进行标准放电，计算容量恢复能力。 Calculate the capacity recovery capability of the cell by standard discharge.

5.4 非脉冲充电模式 Non-pulse Charging Mode

表 3 非脉冲充电

Table 3 Non-pulse charging

电芯温度 Cell temperature	标准充电 standard charging	快速充电 Fast charging
T＜0℃	不允许充电 Charging is not allowed	不允许充电 Charging is not allowed
0℃≤T＜10℃	0.2C(A)恒流充电至 3.65V 0.2C (A) constant current charging to 3.65V	0.3C(A)恒流充电至 3.65V 0.3C(A) constant current charging to 3.65V
10℃≤T＜15℃	0.3C(A)恒流充电至 3.65V，3.65V 恒压充电至电流下降到 0.05C(A) 0.3C (A) constant current charging to 3.65V, 3.65V constant voltage charging until the current drops to 0.05C (A)	0.5C(A)恒流充电至 3.65V，3.65V 恒压充电至电流下降到 0.05C(A) 0.5C(A) constant current charging to 3.65V, 3.65V constant voltage charging until the current drops to 0.05C(A)
15℃≤T＜45℃	0.5C(A)恒流充电至 3.65V，3.65V 恒压充电至电流下降到 0.05C(A) 0.5C (A) constant current charging to 3.65V, 3.65V constant voltage charging until the current drops to 0.05C (A)	1C(A)恒流充电至 3.65V，3.65V 恒压充电至电流下降到 0.05C(A) 1C (A) constant current charging to 3.65V, 3.65V constant voltage charging until the current drops to 0.05C (A)
45℃≤T≤60℃	0.2C(A)恒流充电至 3.65V，3.65V 恒压充电至电流下降到 0.05C(A) 0.2C (A) constant current charging to 3.65V, 3.65V constant voltage charging until the current drops to 0.05C (A)	0.3C(A)恒流充电至 3.65V，3.65V 恒压充电至电流下降到 0.05C(A) 0.3C (A) constant current charging to 3.65V, 3.65V constant voltage charging until the current drops to 0.05C (A)
T＞60℃	不允许充电 Charging is not allowed	不允许充电 Charging is not allowed

5.5 脉冲充电模式 Pulse Charging Mode

表 4 脉冲充电

Table 4 Pulse charging

SOC	温度 Temperature				
	T＜10℃	10℃≤T＜15℃	15℃≤T＜35℃	35℃≤T＜45℃	≥45℃
≤80%	不允许 Not allow	1.2C 30s	1.5C 30s	1.2C 30s	不允许 Not allowed

5.6 非脉冲放电模式 Non-pulse Discharging Mode

表 5 非脉冲放电

Table 5 Non-pulse discharging

序号 S.N.	项目 Item	规格 Spec.	备注 Remark
5.6.1	标准放电电流 Standard discharge current	0.5C	-20℃≤T≤60℃
5.6.2	最大持续放电电流 Maximum continuous discharge current	1C	-20℃≤T≤60℃
5.6.3	允许放电温度范围 Permissible discharge temperature range	-20～60℃	/
5.6.4	最佳放电温度范围 Optimum discharge temperature range	15～35℃	/

5.7 脉冲放电模式 Pulse Discharge Mode

表 6 脉冲放电

Table 6 Pulse discharge

SOC	温度 Temperature				
	T＜10℃	10℃≤T＜15℃	15℃≤T＜35℃	35℃≤T＜45℃	≥45℃
≥30%	不允许 Not allow	1.5C 30s	2C 30s	1.5C 30s	不允许 Not allowed

6 可充放电次数 Cycle performance

表 7 可充放电次数测试

Table 7 Cycle life test

序号 S.N.	项目 Item	技术要求 Technical requirement	测试方法 Test method

6.1	可充放电次数 Cycle performance	≥3000cls	a）25±2℃ 初始夹紧压力300±30Kgf 1C充放电3000cls至容量为初始容量80% 25±2℃ initial clamping pressure 300± 30Kgf, 1C charge and discharge 3000cls to capacity of 80% of the initial capacity b）室温下电芯1C(A)恒流充电至3.65V，3.65V恒压充电至电流下降到0.05C(A)； At room temperature, the cell is charged at a constant current of 1C (A) to 3.65V, and 3.65V constant voltage charging until current drops to 0.05C (A). c）室温下静置30min； Stay at room temperature for 30mins; d）室温下电芯1C放电至2.5V； At room temperature, the cell is discharged at a constant current of 1C (A) to 2.5V. e）室温下静置30min； Stay at room temperature for 30mins; f）重复 b)~e)。 Repeat b)~e) .

7 安全性能 Safety Performance

表 8 安全性能

Table 8 Safety performance

序号 S.N.	项目 Item	技术要求 Technical requirement	测试方法 Test method
7.1	过充电 Overcharge	不起火、不爆炸 No fire, no explosion.	电芯以1C(A)恒流充电至电压达到充电终止电压的1.1倍或115%SOC后停止充电，观察1h。 Charge the cell at 1C (A) constant current until the voltage reaches 1.1 times of the charging termination voltage or 115% SOC, then stop charging and observe for 1hr.
7.2	过放电 Overdischarge	不起火、不爆炸 No fire, no explosion.	电芯以1C(A)恒流放电90min后停止放电，观察1h。 The cell was discharged with 1C (A) constant current for 90 mins, then the discharge was stopped and observed for 1 hr.
7.3	外部短路 External short circuit	不起火、不爆炸 No fire, no explosion.	a）电芯1C恒流充电至3.65V，3.65V恒压充电至电流下降到0.05C(A)； 1C constant current charge to 3.65V, 3.65V constant voltage charge until the current drops to 0.05C(A); b）电芯正、负极经外部短路10min，外部线路电阻＜5mΩ； The positive and negative poles of the cell are short-circuited for 10mins and the external line resistance is less than 5mΩ.

			c）观察1h。Observe 1hr.
7.4	挤压 Extrusion	不起火、不爆炸 No fire, no explosion.	a）电芯1C恒流充电至3.65V，3.65V恒压充电至电流下降到0.05C(A)； 1C constant current charge to 3.65V, 3.65V constant voltage charge until the current drops to 0.05C(A); b）按下列条件进行试验： Conduct tests under the following conditions: 1）挤压方向：垂直于电芯极板方向施压； Extrusion direction: Pressure perpendicular to the battery plates. 2）挤压板形式：半径为75mm的半圆柱体，半圆柱体的长度大于被挤压电芯尺寸； Extruded plate form: The length of the half cylinder of the radius 75mm is larger than the size of the extruded battery. 3）挤压速度：≤2mm/s； Extrusion speed: ≤2mm/s; 4）挤压程度：电压达到0V或形变量达到15%或挤压力达到100KN或1000倍试验对象重量后停止挤压； Extrusion level: Stop extrusion when the voltage reaches 0V or the shape variable reaches 15% or the extrusion pressure reaches 100kN or 1000 times the weight of the test object; 5）保持10min； Hold for 10mins; c）观察1h。Observe 1hr.
7.5	温度循环 Temperature cycle	不起火、不爆炸 No fire, no explosion.	a）电芯1C恒流充电至3.65V，3.65V恒压充电至电流下降到0.05C(A)； 1C constant current charge to 3.65V, 3.65V constant voltage charge until the current drops to 0.05C(A); b）将电芯放入温度箱中，温度箱温度按照下表进行调节，循环次数5次。Put the cell into the temperature box, and adjust the temperature of the temperature box according to table below, with 5 cycles.

温度 Temperature, ℃	时间增量 Time increment min	累计时间 Cumulative time min	温度变化率 Temperature change rate, ℃/min
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

c）观察1h。Observe 1hr.

7.6	加热 Heating	不起火、不爆炸 No fire, no explosion.	a）电芯1C恒流充电至3.65V，3.65V恒压充电至电流下降到0.05C(A)； 1C constant current charge to 3.65V, 3.65V constant voltage charge until the current drops to 0.05C(A); b）将电芯放入加热试验箱，以5℃/min的速率由环境温度升至（130±2）℃，并保持此温度30min后停止加热； Put the cell into the heating test box, and raise the temperature from ambient temperature to (130±2)℃ at the rate of 5℃/min, and stop heating after 30mins. c）观察1h。Observe 1hr.

8 产品寿命终止管理 Product end of life management

8.1 电池的使用期限是有限的。客户应该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。内阻以及容量的测量方法和计算方法需要客户和 DJENERGY 共同讨论和双方同意。当使用中的电池的内阻超过这个电池最初内阻的 200%或容量小于等于标称容量 60%(25±2℃)，应停止使用电池。违反该项要求，将免除 DJENERGY 依据产品销售协议以及本技术协议所应承担的产品质量保证责任。

This cell is designed to service with a finite life time. The customer shall develop and implement an active tracking system to monitor and record impedance of each product in its entire service life. DJENERGY and its customer shall come into agreement about internal resistance and capacity measurement methods, DJENERGY and/or its customer shall stop using any of the products when its resistance exceeds 200% of its internal resistance or it capacity fading to 60% of typical capacity (25±2℃). Failure to comply with this requirements shall render DJENERGY' s warranties under the Contract inapplicable, thereby releasing DJENERGY from any liability in connection therewith.

8.2 电芯寿命判定条件参考 6.1 可充放电次数。

The cell life determination conditions can refer to paragraph 6.1 Cycle performance.

9 应用条件 Application conditions

客户应当确保严格遵守以下与电池相关的应用条件：

Customer shall ensure that the following application conditions in connection with the products are strictly。

9.1 客户应配置电池管理系统，严密监控、管理与保护每个电池。电芯初次使用必须进行小电流满充满放以激活，以保证后续使用中容量的充分发挥。

The customer shall configure a battery management system to closely monitor, manage and protect each battery. When the cell is first used, it must be fully charged and discharged for activating it and giving fully capacity.

9.2 客户应向 DJENERGY 提供电池管理系统详细的设计方案、系统特点、框架、系统数据、格式等相关信息，以供 DJENERGY 对该系统进行设计评估，并建立电池管理档案

Customer shall provide detailed information of the BMS, including but not limited to its design, features, setting and data file format to DJENERGY for design review and record keeping.

9.3 未经 DJENERGY 同意，客户不可擅自修改或者改变电池管理系统的设计和框架，以免影响电池的使用性能。

The customer may not modify or change the design and framework of the battery management system without the consent of DJENERGY to affect the performance of the battery.

9.4 客户应保存完整的电池运转的监测数据，用作产品质量责任划分的参考。不具备完整的电池系统使用期限内的监测数据的，DJENERGY 不承担产品质量保证责任。

Customer shall maintain complete battery operation monitoring data for reference in the division of product quality responsibility. Without complete monitoring data for the life of the battery system, DJENERGY is not responsible for product quality assurance.

9.5 电池管理系统需满足以下最基本的检测和控制要求

The battery management system must meet the following basic test and control requirements.

序号S.N.	项目 Item	规格 Spec	保护动作 Protections
9.5.1	充电终止 Stop charge	3.65V	终止充电 Stop charge
9.5.2	一级过充保护 First level over charge protection	3.7V	终止充电 Stop charging
9.5.3	二级过充保护 Second level over charge protection	3.8V	终止充电并锁定电池管理系统 Stop charge and lock the battery management system
9.5.4	放电终止 Stop discharge	2.6V（>0℃）	终止放电 Stop discharge
9.5.5	一级过放保护 First level over discharge protection	2.5V（≥0℃）	终止放电 Stop discharge
9.5.6	二级过放保护 Second level over discharge protection	2.0V（≥0℃）	终止放电并锁定电池管理系统 Stop discharge and lock the battery management system
9.5.7	短路保护 Short circuit protection	不允许短路 Short circuit not allowed	断开电路 Circuit disconnection
9.5.8	过流保护 Over current protection	参考 5.4~5.7 Refer to 5.4~5.7	管理系统控制电流符合规格 Management system control current meets the specification
9.5.9	过热保护 Overheat protection	参考 5.3.2，5.3.5 Refer to 5.3.2， 5.3.5	过热时终止工作 Stop working in case of overheating
9.5.10	充电时间过长保护 charging time out limit	充电时间在 8 小时内 Charging completes within 8 hours	充电时间长于 8 小时，则终止充电 Stop charging if charging time exceeds specification

备注：以上 No.9.5.2、9.5.3、9.5.5、9.5.6 为警示条款，提请客户注意：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技术协议规定的使用条件，客户需依“保护动作”

及本技术协议其他相关规定对电池采取保护措施，同时，DJENERGY 声明对上述使用状态的电池质量不承担任何保证责任，并对因此而导致的客户及第三方的任何损失不予赔偿。

Note: The above No. 9.5.2, 9.5.3, 9.5.5, 9.5.6 are the warning clause, draw the attention of customers: When the battery reaches any of the terms described in the above, means that the battery has been used beyond the specifications, the customer shall take protective measures on the battery in accordance with the "protection action" and other relevant provisions of this specification. At the same time, the DJENERGY shall not take any responsibility for the damage in connection therewith.

9.6 避免电池到达过放状态。电池电压低于 2.0V 时，电池内部可能会遭到永久性的损坏，此时 DJENERGY 的产品质量保证责任失效。根据本技术协议第 4.8 条，当实际放电截止电压低于标准放电截止电压时，系统内部能耗降低到最小，并在重新充电之前延长休眠时间。客户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。

Avoid overdischarge of the battery. If the battery voltage falls below 2.0V, there is a risk of permanent internal damage, which invalidates DJENERGY's warranty. According to Clause 4.8 of this technical Agreement, when the actual discharge cut-off voltage is lower than the standard discharge cut-off voltage, the internal energy consumption of the system is reduced to a minimum and the sleep time is extended before recharging. The customer needs to train the user to recharge the battery in the shortest possible time to prevent the battery from overdischarge.

9.7 电池在存放过程中，建议每隔 3 个月将 SOC 调整为 50%左右

During battery storage, it is recommended to adjust SOC to about 50% every 3 months

9.8 电池避免在本技术协议禁止的低温条件下充电(包括标准充电，快充，紧急情况充电)，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温度进行控制。禁止在低于本技术协议规定的温度条件下充电，否则 DJENERGY 不承担质量保证责任。

Batteries shall avoid charging at low temperatures prohibited by this Technical Agreement (including standard charging, fast charging and emergency charging), otherwise accidental capacity reduction may occur. Battery management system shall be controlled according to the minimum charging temperature. It is forbidden to charge under the temperature stipulated in this technical agreement. Otherwise, DJENERGY will not undertake the responsibility of quality assurance.

9.9 电箱设计中应充分考虑电芯的散热问题，由于电箱散热设计问题导致的电芯或电池过热损坏，DJENERGY 不承担质量保证责任。

The design of the electric box must fully consider the heat dissipation problem of the cell. DJENERGY does not take the responsibility due to the overheating of the cell or batteries caused by the thermal design problem of the electric box.

9.10 电箱设计中应符合有关规范要求（防火、防水、防尘等）否则由此引发的电池损坏和系统风险 DJENERGY 不承担质量损失

The design of the electric box should comply with the relevant specifications (anti-fire, anti-water, anti-dust, etc.), otherwise, DJENERGY does not bear the quality loss for the battery damage and system risk caused by.

10 安全防范 Safety Precautions

10.1 禁止将电池浸入水中。

Immerse cells into water is prohibited.

10.2 禁止将电池投入火中或长时间暴露在超过本技术协议第 5.3.2 条，第 5.3.5 条和第 4.15 条规定的温度条件的高温环境中，否则可能会导致火灾。在任何正常的充放电使用情况下，电芯温度不能超过 60℃，如果电芯温度超过 60℃，电池管理系统需关闭电池，停止电池运行。

Drop cells into fire or expose them to any high temperature environment exceeding operation temperature as set out in paragraphs 5.3.2、5.3.5&4.15 are forbidden, otherwise it may cause fire. At all use time, cell temperature should not exceed 60℃;if the temperature of the battery cell exceeds 60℃, the battery management system shall shut down the battery and stop the battery running.

10.3 禁止电池正负极短路，否则强电流和高温可能导致人身伤害或者火灾。在电池系统组装和连接时，应有足够的安全保护，以避免短路。

Do not short circuit the positive and negative battery terminals. Otherwise, strong current and high temperature may cause personal injury or fire. When the battery system is assembled and connected, adequate safety protection shall be provided to avoid short circuit.

10.4 严格按照标示和说明连接电池正负极，禁止反向充电。

Always connect cell terminals according to its label(s) in right polarity. Reverse charging is strictly prohibited.

10.5 禁止超过最大电流进行电池充电，和禁止电池过充。否则，可能引起电池过热和火灾事故的发生。在电池安装和使用中，硬件和软件需实行多重过充失效安全保护。最低保护要求见本技术协议第 9.5.1~9.5.6 条。

Do not exceed the maximum current for battery charging, and do not overcharge the battery. Multiple level of fail-safe overcharge protection should be implemented by hardware and software. See paragraph 9.5.1~9.5.6 for minimum requirement to be adopted by the BMS for protection.

10.6 客户应将电池安全地固定在固体平面上，并将电源线安全地束缚在合适的位置，以避免摩擦而引起电弧和火花。

Products should be securely fixed to solid platform, and power cables should be securely attached by fastener to avoid intermittent contact which may cause arcing and sparks.

10.7 严禁用塑料封装电池或用塑料进行电气连接。不正确的电气连接方式可能会造成电池使用过程中发生过热现象。

Do not service cells and electrical connections within plastic package of cell. Improper electrical connection within a cell may cause overheating in service.

10.8 当电解液泄露时，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池的任何部件或电池所含物质。

When the electrolyte leaks, skin and eye contact with the electrolyte should be avoided. In case of contact, a large amount of clean water should be used to clean the contact area and seek help from the doctor. It is forbidden for any person or animal to swallow any part or substance contained in the battery.

10.9 尽力保护电池，使其免受机械震动、碰撞及压力冲击，否则电池内部可能短路，产生高温和火灾。

Protect cells from mechanical shock, impact and pressure. Internal electrical circuit may

short circuit to generate high temperature and fire hazards.

10.10 电池充电过程中可能发生不适当的终止充电现象。如:超出允许的充电时间充电，充电电压过高而终止充电或充电电流过强而终止充电。上述现象被定义为“不适当的终止充电”。当发生以上现象时，可能意味着电池系统出现漏电或某些部件出现故障。在没有找到根本原因并彻底解决之前继续对该电池充电可能会引起电池过热或发生火灾。当发生以上现象时，电池管理系统应该通过自动锁定功能，禁止后续的充电，并提醒使用者将装载有该电池的交通工具退回到经销商处进行系统维护。该电池只有经过有认证资格的技术人员全面检查，确定根本原因并彻底解决、改善后方可恢复充电。

When cells charging is terminated improperly for reasons such as exceeding allowable charging time, cut-off due to exceeding charging voltage or cut-off due to exceeding charging current, all these events are defined as “improper charge termination”. Such event may indicate that there is current leaking within a cell system or some components have started to malfunction and subsequent charging of such cell system without finding and fixing root cause of problem may cause potential overheat or fire hazards. When such event occurs, the BMS should lock itself up to prevent subsequent charging and notice should be given to the user to return the vehicle to dealer for servicing. Subsequent charging should only be resumed after the system has been thoroughly checked by qualified technician who can identify and fix root cause attributed to the “improper charge termination”.

10.11 在进行滥用测试实验时如操作不当可能会引起电池起火或者爆炸。该测试实验只能由配备适当的防护装备的专业人员在专业的实验室进行。否则，可能会导致严重的人身伤害和财产损失。

Battery fire or explosion may be caused by improper operation during abuse test. The test can only be carried out in a professional laboratory by professionals equipped with appropriate protective equipment. Otherwise, it may lead to serious personal injury and property loss.

11 免责声明 Disclaimer

11.1 如果由于产品需求单位不按本说明书中的规定进行使用，本公司不承担质量保证责任

If the product demand unit does not use the product according to the provisions of this specification, DJENERGY will not undertake the responsibility of quality assurance.

11.2 DJENERGY 保留对产品的规格及性能参数修改的权利。买方在订购 DJENERGY 产品前，需要与 DJENERGY 提前确认产品的最新状态。

DJENERGY reserves the right to modify the specifications and performance parameters of the product. Before ordering DJENERGY products, the buyer needs to confirm the latest status of the products in advance with DJENERGY.

11.3 英文规格释义仅供参考，请以中文版技术规格要求为准。

English specifications are for reference only. Please refer to the technical specifications of the Chinese version.

12 风险警告 Risk Warning

12.1 警示声明 Waring statement

警 告

电池存在潜在的危险，在操作和维护时必须采取适当的防护措施！

不正确地滥用测试实验，可能导致严重的人身伤害和财产损失！

必须使用正确的工具和防护装备操作电池。

电池的维护必须由具有电池专业知识并经过安全培训的人士执行。

不遵守上述警告可能造成多种灾难。

电池的使用和储存需要符合规范要求，否则会给电池带来不可逆伤害，甚至引发风险。

BATTERY ARE POTENTIALLY DANGEROUS AND PROPER PRECAUTIONS MUST BE OBSERVED IN HANDLING AND MAINTENANCE.

RUNNING TESTS ~~ON~~ THE BATTERY IMPROPERLY MAY RESULT IN SEVERE ~~PERSONAL~~ BODY INJURY OR PROPERTY DAMAGES.

WORK ON CELLS MUST BE PERFORMED ONLY WITH PROPER TOOLS AND PROTECTIVE EQUIPMENT MUST BE USED.

BATTERY MAINTENANCE MUST BE CARRIED OUT BY PERSONNEL KNOWLEDGEABLE OF CELLS AND TRAINED IN THE SAFETY PRECAUTIONS INVOLVED.

FAILURE TO OBSERVE THE ABOVE MAY CAUSE VARIOUS HAZARDS.

BATTERY USE AND STORAGE REQUIRES COMPOSITE SPECIFICATION REQUIREMENTS, OTHERWISE IT WILL CAUSE IRREVERSIBLE DAMAGE TO THE BATTERY, EVEN RAISES RISKS。

12.2 危险类型：Types of Hazards

客户知悉在电池使用和操作过程中存在以下潜在的危险:

Customer acknowledges the following potential hazards in connection with the usage and handling of the Products:

12.2.1 操作者在操作时可能会受到化学品、电击或者电弧的伤害。尽管人体对遭受直流电与交流电的反应不同，但是高于 50V 的直流电压与交流电对人体的伤害是同样严重的，因此客户必须在操作中采取保守的姿势以避免电流的伤害。

Working with battery can expose the handler to chemical, shock and/or arcing hazards. Although a person's body might react to contact with direct current voltage differently than from contact with alternate current voltage, Customer shall take a conservative position and consider the risk of shock or electrocution to be the same for both alternate current and direct current exposures greater than 50V.

12.2.2 存在来自电池中的电解液的化学风险。

Cells expose its handler to chemical hazards associated with the electrolyte used in the cell.

12.2.3 在操作电池和选择个人防护装备时，客户及其雇员必须考虑到以上潜在的风险，防止发生意外短路，造成电弧、爆炸或热失控。

When selecting work practices and personal protective equipment, customer and its employees should consider potential exposure to these hazards and therefore prevent accidental short-circuit that can result in electrical arcing, explosion, and/or "thermal runaway" of the cells.

13 附录 Appendix

13.1 电芯外观图 Cell Outside View Drawing

13.2 电芯尺寸图 Cell Dimension Drawing

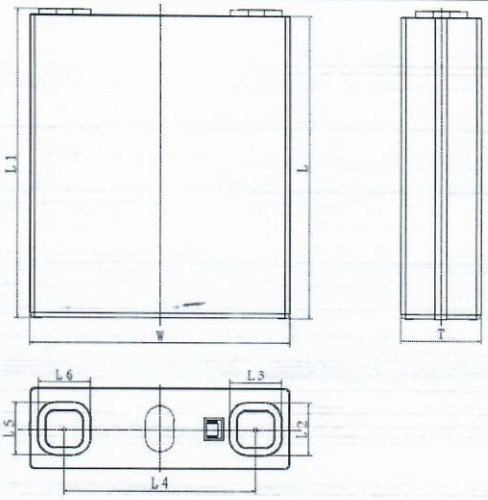


表 9 电芯尺寸

Table 9 Cell dimension

No.	Name	Dimension parameters
1	T	54.3±1.0mm
2	W	173.8±0.6mm
3	L	200.66±0.6mm
4	L1	204.83±0.6mm
5	L2=L3=L5=L6	34.8±0.5mm
6	L4	128.0±0.5mm

备注：

a) 极柱允许焊接熔深≤2.0mm。
Allowable welding melting depth of pole ≤ 2.0mm.

b) 电芯尺寸测量时厚度方向施加 300±30Kgf 压力。
300±30kgf pressure is applied in the thickness direction during the measurement of cell size.

c) 电芯表面绝缘性：绝缘测试压力 300±30kgf，AC1500V，漏电流≤10mA。
Cell surface insulation, test pressure 300±30Kgf, AC1500V, leakage current ≤ 10mA.