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前 言 PREFACE 本标准为公司统一执行的企业标准。 This standard is the enterprise standard for the unified execution of the company 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 the requirements of GB/T 1.1-2009, "first part of standardization work guideline: 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/T 31485-2015 《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》、Q/GX 003-2015 《电动汽车用锂离子动力蓄电池技术规范》的基础上，结合我公司产品实际和试验条件，特制定 Q/GX 021-2018 《IFP27175200A-105Ah 锂离子电池产品规格书》标准，并对试验方法、判定标准内容进行了修订和补充，以指导 IFP27175200A-105Ah 锂离子电池产品的制造和验收。 This standard is referred to GB/T 31484-2015 "cycle life requirements and test methods for power battery for electric vehicles", GB/T 31485-2015 "safety requirements and test methods for power batteries for electric vehicles", GB/T 31486-2015 "electrical performance requirements and test methods for power battery for electric vehicles ", Q/GX 003-2015 " technical specification for lithium ion power battery for electric vehicles". Combined with the actual and experimental conditions of our company's products, the standard of Q/GX 021-2018 " Product Specification For IFP27175200A-105Ah Lithium ion rechargeable cell " was specially set, and the test method and criteria were revised and supplemented to guide the manufacture and acceptance of IFP27175200A-105Ah lithium ion battery.						

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本标准由技术中心提出并起草。 This standard is proposed and drafted by the battery research institute. 本标准由标准法规部归口管理。 This standard is managed by the Department of standard and statute. 本标准主要起草人：汪涛、 The main drafters of this standard: Tao Wang.					

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1 范围 scope 本产品规格书规定了 IFP27175200A-105Ah 型锂离子电池的性能要求、试验方法、检验规则、标志、包装、运输和贮存要求。 The specification of this product stipulates the performance requirements, test methods, inspection regulation, markings, packaging, transportation and storage requirements for IFP27175200A-105Ah lithium ion batteries. 本产品规格书适用于公司生产的 IFP27175200A-105Ah 型锂离子电池。 This product specification is applicable to IFP27175200A-105Ah lithium ion batteries produced by our company. 2 规范性引用文件 Normative reference files 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。然而，鼓励根据本标准达成协议的各方研究是否可使用这些文件的最新版本。凡是不注日期的引用文件，其最新版本适用于本标准。 The terms in the following documents are cited by this standard and become the terms of this standard. However, the parties who have reached an agreement under this standard are encouraged to study whether the latest version of these documents can be used. The latest version of any non dated reference document is applicable to this standard. GB/T 2900.41 电工术语原电池和蓄电池 GB/T 2900.41 electrician term primary battery and storage battery GB/T 19596 电动汽车术语 GB/T 19596 electric vehicle terminology 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 power battery for electric vehicles GB/T 31485-2015 电动汽车用动力蓄电池安全要求及试验方法 GB/T 31485-2015 safety requirements and test methods for power batteries for 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 power battery for electric vehicles Q/GX 003-2015 电动汽车用锂离子动力蓄电池技术规范 Q/GX 003-2015 technical		

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specification for lithium ion power battery for electric vehicles 3 术语和定义 terms and definitions 3.1 倍率电流: 缩写符号 C, 1C 表示电池以 1 小时率充放电的电流, 3C 表示电池以 1/3 小时率充放电的电流。 3.1 rate current: the abbreviation symbol C, 1C indicates that the battery charges at a rate of 1 hour, and 3C represents the current at which the battery charges at 1/3 hourly rate. 3.2 直流内阻: 电池在室温 (25℃ ±2℃)、50%SOC 条件下, 以最大脉冲电流放电 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。 3.2 DC internal resistance: under the condition of room temperature (25 + 2)℃ and 50%SOC, the 10s maximum pulse discharge current is used to calculate the voltage and current changes before and after the discharge, and then the difference value of the voltage change is divided by the difference of current change, that is, DC internal resistance. 3.3 最大持续充电电流: 电池在指定温度下, 保证电池正常工作所允许进行持续充电的最大电流 3.3 the maximum continuous charge current: the maximum charging current allowed by the battery to operate continuously at a specified temperature. 3.4 最大持续放电电流: 电池在指定温度下, 保证电池正常工作所允许进行持续放电的最大电流 3.4 the maximum continuous discharge current: the maximum discharging current allowed by the battery to operate continuously at a specified temperature. 3.5 恒流充电容量比例: 电池在室温、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。 3.5 constant current charge capacity ratio: at room temperature and 0%SOC, the ratio of the charge capacity by the constant current charge to the cut-off voltage 3.65V and the charge capacity under the standard charging method. 3.6 冷启动功率: 在-20℃、50%SOC 条件下, 电池的 2s 脉冲最大放电功率。 3.6 cold cranking power: the maximum discharge power of 2S pulse at -20℃ and		

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50%SOC.									
3.7 产品型号含义: product model meaning									
IF P 27 175 200 A – 105Ah									
		代表蓄电池额定容量 Indicates rated capacity of the cell							
		代表蓄电池壳体材质为铝 Indicates the material of the cell shell is aluminum							
		代表蓄电池高度尺寸 Indicates the height of the cell							
		代表蓄电池宽度尺寸 Indicates the width of the cell							
		代表蓄电池厚度尺寸 Indicates the thickness of the cell							
		代表蓄电池形状为方形 Indicates the shape of the cell, and P defines prismatic							
		代表蓄电池正极材料为磷酸铁锂 Indicates cathode material lithium iron phosphate of the cell							
4 基本性能 Basic performance									
表 1 基本性能 Table 1 General Properties									
项目 Item		规格 Specification		备注 Remark					
4.1 外观 appearance		无破裂、划痕、变形、污渍、 电解液泄漏等 Without rupture, scratch, deformation, stain, electrolyte leakage, etc.							
4.2 尺寸 dimention		(27.5±0.8)mm*(175±0.3)mm* (200±0.3)mm 一个月以内 within 1 month		包括蓝膜、绝缘介质厚度, 束缚力: 30kgf; 存储环境温度 < 35℃ Including blue film, insulating medium thickness, binding force: 30kgf; Storage environment temperature < 35℃, within 1 month					
		(28.0±0.8)mm*(175±0.3)mm* (200±0.3)mm 6 个月以内 within 6 month		包括蓝膜、绝缘介质厚度, 束缚力: 30kgf; 存储环境温度 < 35℃ Including blue film, insulating medium thickness, binding force:					

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			30kgf; Storage environment temperature < 35℃, within 1 month			
4.3 重量 Weight	(2060±50)g					
4.4 标称电压 Nominal voltage	3.2V					
4.5 交流内阻 AC-impedance	(0.4~0.7) mΩ					
4.6 直流内阻 DC internal resistance	≤1.5mΩ	50%SOC				
4.7 海拔高度 Altitude	≤4000m					
4.8 推荐电压窗口 Recommended SOC	10~90%					
4.9 存储温度 Storage temperature	-20~45℃	Short term (within 1 month)				
	0~35℃	Long term (within 1 year)				

5 电性能 Electrical properties

5.1 充电性能 charging

表 2 充电性能
Table 2 charging properties

项目 Item	规格 Specification	备注 Remark
5.1.1 最大持续充电电流 maximum continuous charge current	0.1C	0℃~5℃ 0%SOC~80%SOC
	0.5C	5℃~15℃ 0%SOC~100%SOC
	1.0C	15℃~35℃ 0%SOC~100%SOC
	2.0C	15℃~35℃ 0%SOC~80%SOC
	0.5C	35℃~55℃ 0%SOC~100%SOC
5.1.2 最大允许充电电压 Maximum allowable charge voltage	3.9V	
5.1.3 最大允许充电温度范围 Maximum allowable charge temperature range	0℃~55℃	

表 2 充电性能（续）

项目	规格	备注
5.1.4 最佳充电温度范围 Optimum charge temperature range	10℃~35℃	
5.1.5 恒流充电容量比例 Constant current charging capacity	>90%	2C

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ratio					
5.2 放电性能 discharging					
表 3 放电性能 Table 3 discharging properties					
项目 Item		规格 Specification		备注 Remark	
5.2.1 最大持续放电电流 Maximum continuous discharge current		2C		温升<15℃（25℃） Temperature rise < 15℃（25℃）	
5.2.2 最大脉冲放电电流 Maximum pulse discharge current		5C（10s）		电池表面温度≤45℃，持续时间 10s（25℃条件） surface temperature≤45℃，and the duration is 10s（25℃）.	
5.2.3 最低允许放电电压 Minimum allowable discharge voltage		1.8V		低于 0℃下放电下限电压 Lower limit discharging voltage under 0℃	
5.2.4 最大允许放电温度范围 Maximum allowable discharge temperature range		-30℃～60℃			
5.2.5 最佳放电温度范围 Optimum discharge temperature range		10℃～35℃			
5.2.6 室温放电容量 Room temperature discharge capacity		≥105Ah			
5.2.7 高温放电容量 High temperature discharge capacity		≥105Ah		55℃，1C	
5.2.8 低温放电容量/能量保持率 Low temperature discharge capacity / energy retention		≥90% / ≥85%		0℃，1C，截止电压 1.8V 0℃,1C,cut-off voltage 1.8V	
		≥85% / ≥75%		-10℃，1C，截止电压 1.8V -10℃,1C,cut-off voltage 1.8V	
		≥80%/ ≥70%		-20℃，1C，截止电压 1.8V -20℃,1C,cut-off voltage 1.8V	
		≥70%/ ≥55%		-30℃，1C，截止电压 1.8V -30℃,1C,cut-off voltage 1.8V	
5.2.9 容量与存储时间关系		0 个月，容量≥100%初始容量 0 month, capacity ≥100% initial capacity 1 个月，容量≥97%初始容量 1 month, capacity ≥97% initial		25℃±2℃温度，30%SOC 存储 25℃ ±2℃ temperature, 30%SOC storage	

	For W127/02500 100Ah Lithium-ion rechargeable cell	total
	capacity 2 个月, 容量 $\geq 96.5\%$ 初始容量 2 months, capacity $\geq 96.5\%$ initial capacity 3 个月, 容量 $\geq 96\%$ 初始容量 3 months, capacity $\geq 96\%$ initial capacity 4 个月, 容量 $\geq 95.5\%$ 初始容量 4 months, capacity $\geq 95.5\%$ initial capacity 5 个月, 容量 $\geq 95\%$ 初始容量 5 months, capacity $\geq 95\%$ initial capacity 6 个月, 容量 ≥ 94.5 初始容量 6 months, capacity $\geq 94.5\%$ initial capacity	
5.2.10 SOC-OCV 表 SOC - OCV table	见附录 A.3 See appendix A.3	
5.2.11 充放电能量效率 Charge-discharge energy efficiency	$\geq 90\%$	25°C, 1C

5.3 功率性能 Power performance

表 4 功率性能

Table 4 Power performance

项目 Item	规格 Specification	备注 Remark
5.3.1 质量功率密度 Mass power density	≥1300W/kg	50%SOC, 25℃
5.3.2 体积功率密度 volumetric power density	≥2500 W/L	50%SOC, 25℃
5.3.3 最大放电功率 Maximum discharge power	2500W	50%SOC , 25℃ , 参见 (see)7.10
5.3.4 最大反馈功率 Maximum regen power	1400W	50%SOC, 25℃, 参见 7.10

5.4 电池寿命 cell life

表 5 电池寿命

Table 5 cell life

项目 Item	规格 Specification	备注 Remark
5.4.1 标准循环寿命 Standard cycle life	≥3000 次	80%容量保持率, 0.5C/0.5C
	≥3000 times	80%EOL,0.5C/0.5C
	≥1500 次	80%容量保持率; 25℃, 阶

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		≥1500 times	梯充电（115.5A 恒流充电至 3.50V，57.5A 恒流充电至 3.60V，28.75A 恒流充电至 3.62V，10.5A 恒流充电至 3.65V；100~150kgf），105A 恒流放电至 2.0V 80%EOL，25℃，Step charging（115.5A CC charging to 3.50V，57.5A CC charging to 3.60V，28.75A CC charging to 3.62V，10.5A CC charging to 3.65V，100~150kgf），105A constant discharge to 2.0V	
5.4.2 高温循环寿命 High temperature cycle life	≥1500 次 ≥1500 times	80%容量保持率，45℃，0.5C/1C 80%EOL,45℃ 0.5C/1C		
	≥800 次 ≥800 times	80%容量保持率，55℃，0.5C/1C 80%EOL,55℃ 0.5C/1C		
5.4.3 日历寿命 calendar life	≥15 年 ≥15 years	70%容量保持率,25℃，100%SOC 70% EOL,25℃，100%SOC		
5.5 存储性能 Storage performance				
表 6 存储性能 Table 6 Storage performance				
项目 Item	规格 Specification	备注 Remark		
5.5.1 最佳存储温度范围 Optimum storage temperature range	10℃~30℃			
5.5.2 自放电率 Self-discharge rate	≤4%	25℃，28 天 25℃，28 days		
5.5.3 室温荷电保持率 Room temperature charge retention rate	≥96%	25℃，28 天，参考 7.8		
5.5.4 室温容量恢复率 Room temperature capacity recovery rate	≥97%			
5.5.5 高温荷电保持率 High temperature charge retention rate	≥94%	55℃，7 天，参考 7.8		

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5.5.6 高温容量恢复率 High temperature capacity recovery rate		≥95%			
5.5.7 储存容量恢复率 storage capacity recovery rate		>94%	45℃，50%SOC，28 天		

6 安全性能 Safety performance

表 7 安全性能
Table 7 Safety performance

项目 Item	规格 Specification	备注 Remark
6.1 过放电 Over discharge	不爆炸，不起火，不漏液 No explosion, no fire, no leakage	GBT 31485-2015
6.2 过充电 Over charge	不爆炸，不起火 No explosion, no fire	GBT 31485-2015
6.3 短路 short circuit	不爆炸，不起火 No explosion, no fire	GBT 31485-2015
6.4 跌落 drop	不爆炸，不起火，不漏液 No explosion, no fire, no leakage	GBT 31485-2015
6.5 加热 heating	不爆炸，不起火 No explosion, no fire	GBT 31485-2015
6.6 挤压 crash	不爆炸，不起火 No explosion, no fire	GBT 31485-2015
6.7 海水浸泡 Seawater immersion	不爆炸，不起火 No explosion, no fire	GBT 31485-2015
6.8 温度循环 Temperature cycling	不爆炸，不起火，不漏液 No explosion, no fire, no leakage	GBT 31485-2015
6.9 低气压 Low pressure	不爆炸，不起火，不漏液 No explosion, no fire, no leakage	GBT 31485-2015

7 测试方法

7 Test Method

7.1 测试环境

7.1 Test Conditions

除另有备注说明外，电池测试环境条件为：温度 25℃ ±2℃，相对湿度为 25%～85%，大气压力 86kPa～106kPa；电池充电采用 7.2 方式；电池放电采用 7.3 方式；本标准中所提到的室温，是指 25℃ ±2℃。

Unless otherwise stated in this standard, the cell shall be tested at the room temperature of (25±2)℃ , relative humidity of 25%~85%, and atmospheric pressure of 86kPa～106kPa; Cells charging method refers to 7.2 and

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discharging method refers to 7.3; The room temperature mentioned in this standard is 25℃ ±2℃. 7.2 标准充电 7.2 Standard Charge 室温下（25℃ ±2℃），单体蓄电池以 1C 电流放电至电压为 2.0V，静置 1h，然后再以 1C 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，充电后静置 1h。 At room temperature(25℃ ±2℃) conditions, the cell with 1C current discharges to a voltage of 2.0V, rest 1h, then with 1C constant current charges to 3.65（V）, again with constant voltage 3.65（V）charges until the charge current drops to 0.05 C, rest 1h. 7.3 标准放电 7.3 Standard discharge 先按照 7.2 充满电，室温下，单体蓄电池以 1C 电流放电至电压为 2.0V 截止。 At room temperature, the cell shall be charged firstly according to 7.2 ,then with 1C current discharges to a voltage of 2.0V. 7.4 直流内阻 7.4 DC internal resistance 按 7.2 方法充电，在室温下以 1C 电流放电 30min 后，以 5C 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。 At room temperature, cell shall be charged firstly according to 7.2, with 1C current discharge for 30min, then with 5C current discharge for 10s. Calculate the voltage and current difference before and after discharge, then DC internal resistances are determined using a ΔV/ΔI calculation. 7.5 低温放电容量 7.5 Low Temperature Discharge Capacity 按 7.2 方法充电；在 5.2.8 规定温度下储存 20h；在对应温度下以 1C 电流放电，放电至 1.8V。按此方法测试不同温度下的放电能力。 Cell shall be charged according to 7.2, keep the cell at temperature as mentioned 5.2.8 for 20h, then discharge with current of 1.0C to the cut-off voltage of 1.8V. Calculate discharge capacity at different temperatures. 7.6 高温放电容量 7.6 High Temperature Discharge Capacity					

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按 7.2 方法充电; 在 55℃ ±2℃ 下储存 5h; 在 55℃ ±2℃ 下以 1C 电流放电, 放电至 2.0V, 得到高温放电容量。 Cell shall be charged according to 7.2 , keep the battery at 55℃ ±2℃ for 5 hours, then discharge with current of 1.0C to the cut-off voltage of 2.0V at temperature of 55℃ ±2℃, calculate the discharge capacity. 7.7 室温倍率充放电容量 7.7 Room temperature C-rate charge/discharge capacity 室温下, 以 7.3 方法放电, 分别以规定倍率进行恒流充电至 3.65V, 得到不同倍率下的充电容量; 室温下, 以 7.2 方法充电, 分别以规定倍率进行放电至 2.0V, 得到不同倍率下的放电容量。 At room temperature, cell shall be discharged according to 7.3, with different current rate charging to 3.65 (V) , then with constant voltage 3.65 (V) charge until the charge current drops to 0.05 C, again calculate the charge capacity for different rate. At room temperature, battery shall be charged according to 7.2, with different current rate discharging to 2.0 (V) , then calculate the discharge capacity for different rate. 7.8 荷电保持率、自放电率与容量恢复率 7.8 Charge retention rate, Self-discharge rate and Capacity recovery rate 按 7.2 方法充电, 在室温下储存 28 天或在 55℃ ±2℃ 下储存 7 天后, 以 1C 电流放电至 2.0V, 得到放电容量, 其与初始容量的比值即为荷电保持率; Cell shall be charged according to 7.2, storage at room temperature for 28 days or keep the cell at 55℃ ±2℃ for 7 days, with 1C current discharge to a voltage of 2.0V, calculate the discharge capacity, the ratio of the discharge capacity to the initial capacity is the charge retention rate. 再按 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; Recharge the cell according to 7.2 and discharge according to 7.3, calculate recovery capacity, the ratio of the recovery capacity to the initial capacity is the capacity recovery rate. 室温容量恢复率与室温荷电保持率的差值,即为电池自放电率。 The difference between room temperature capacity recovery rate and room temperature charge retention rate is the battery self-discharge rate. 7.9 存储容量恢复率 7.9 Storage capacity recovery rate				

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按 7.2 方法充电，在室温下以 1C 电流放电 30min 后，在 45℃ ±2℃ 下储存 28 天，按 7.2 方法充电，在室温下以 1C 电流放电至 2.0V，得到放电容量，其于初始容量的比值即为存储容量恢复率。 At room temperature, cell shall be charged according to 7.2, with 1C current discharge for 30min, storage at temperature of 45℃ for 28 days, again recharge the cell according to 7.2, then with 1C current discharge to a voltage of 2.0V, calculate the discharge capacity, the ratio of the discharge capacity to the initial capacity is storage capacity recovery rate. 7.10 最大放电功率和最大反馈功率 7.10 Maximum discharge power and Maximum Regen power 按 7.3、7.5 和 7.6 方法得出不同温度下的放电容量，并以此作为不同温度下的 SOC 计算标准；按 7.2 方法充电后于待测环境温度下搁置相应时间后（>0℃，5h；≤0℃，20h），以 1C 电流放电调整 SOC 为 90%，静置 1h 后，以当前温度最大脉冲 5C 电流放电 10s，搁置 40s，再以当前温度允许脉冲 3.75C 电流充电 10s；依次以 1C 电流将 SOC 调整为 80%，70%，...10%，测试不同 SOC 下脉冲充放电能力，记录过程数据，按照 HPPC 测试方法中直流内阻和脉冲功率的计算公式，计算出不同温度和 SOC 下的最大放电功率和最大反馈功率。 (1). According to the 7.3, 7.5 and 7.6 methods, calculate discharge capacity which are used as the SOC calculation standard for different temperatures. (2). Cell shall be charged according to 7.2, then keep the cell at the corresponding temperature and time（>0℃:5h；≤0℃:20h）. (3). Adjust the SOC to 90% by the 1C current discharge., rest 1h, with the 5C pulse discharge for 10s, rest 40s, then with the 3.75C pulse charge for 10s, rest 1h, adjust next SOC (80%, 70%....10%) by the 1C current discharge, repeat the above procedures to test discharge performance for different SOC. (4). According to the HPPC test methods, calculate the DC internal resistance, maximum discharge power and maximum regen power for different temperature and SOC. 7.11 冷启动测试 7.11 Cold Cranking Test 按 7.2 方法充电，在室温下以 1C 电流放电至 50%SOC，将电池放置到 -20℃ 环境下搁置 20h，然后在 -20℃ 环境下以 5kW/BSF 功率放电 2s，然后静置 10s，重复 3 次 (BSF 参见 Q/GX 003-2015，5.1.15)。		

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At room temperature, cell shall be charged according to 7.2, with 1C current discharge for soc@50%, keep the battery at temperature of -20℃ for 20h, then with 5kW/BSF power discharge for 2s,rest10s, repeat three times (BSF refer to Q/GX 003-2015, 5.1.15). 7.12 标准循环寿命和高温循环寿命 7.12 Standard Cycle Life and High Temperature Cycle Life 7.12.1 标准循环寿命 7.12.1 Standard Cycle Life 电池在室温环境下, 以 1C 恒定电流充电至 3.65V 转恒压充电, 直到电流降至 0.05C 截止,静置 10min, 然后以 1C 电流放电至 2.0V, 重复 500 次时放电容量应不低于额定容量的 93%, 或者循环次数达到 3000 次时放电容量应不低于额定容量的 80%。 At room temperature conditions, with 1C constant current charging to 3.65V, then with constant voltage 3.65V charge until the charge current drops to 0.05 C, rest 10 min; Again with discharge current of 1C till 2.0V, after 500 cycles, the discharge capacity shall not be less than 93% of the rated capacity, or after 3000 cycles, the discharge capacity shall not be less than 80% of the rated capacity. 7.12.2 45℃循环寿命 7.12.2 45℃ Cycle Life 电池在 45℃环境下, 以 1C 恒定电流充电至 3.65V 转恒压充电, 直到电流降至 0.05C 截止,静置 10min, 然后以 1C 电流放电至 2.0V, 重复 1500 次时放电容量应不低于额定容量的 80%。 At ambient temperature of 45℃, with 1C constant current charging to 3.65V, then with constant voltage 3.65V charge until the charge current drops to 0.05 C, rest 10 min; Again with discharge current of 1C till 2.0V, after 1500 cycles, the discharge capacity shall not be less than 80% of the rated capacity. 7.12.3 55℃循环寿命 7.12.3 55℃ Cycle Life 电池在 55℃环境下, 以 1C 恒定电流充电至 3.65V 转恒压充电, 直到电流降至 0.05C 截止,静置 10min, 然后以 1C 电流放电至 2.0V, 重复 800 次时放电容量应不低于额定容量的 80%。 At ambient temperature of 55℃, with 1C constant current charging to 3.65V, then with constant voltage 3.65V charge until the charge current drops to 0.05 C, rest 10 min, again with discharge current of 1C till 2.0V, after 800 cycles, the discharge capacity shall not be less than 80% of the rated capacity. 8 检验规则						

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8 Inspection regulation					
8.1 检验项目按表 8 的规定					
8.1 Inspection items are specified in table 8					
表 8 检验项目					
Table 8 Inspection items					
检验类型 Inspection Type		检验项目 Inspection items			检验数量 Inspection Quantity
免检项目 Exempted inspection Items		4.4 标称电压 4.4 Nominal Voltage 4.7 额定容量 4.7 Rated Capacity 4.8 工作电压 4.8 Operating Voltage 5.1.2 最大允许充电电压 5.1.2 Maximum allowable charge voltage 5.1.3 最大允许充电温度范围 5.1.3 Maximum charge temperature range 5.1.4 最佳充电温度范围 5.1.4 Optimum charge temperature range 5.2.3 最低允许放电电压 5.2.3 Minimum allowable discharge voltage 5.2.4 最大允许放电温度范围 5.2.4 Maximum allowable discharge temperature range 5.2.5 最佳放电温度范围 5.2.5 Optimum discharge temperature range 5.5.1 最佳存储温度范围 5.5.1 Optimum storage temperature range			/
出厂检验 Delivery inspection		4.1 外观 4.1 Appearance 4.5 交流内阻 4.5 AC-Impedance 5.2.6 室温放电容量 5.2.6 Room temperature discharge capacity 5.5.2 自放电率 5.5.2 Self-Discharge rate			100%
		4.2 尺寸 4.2 Dimension 4.3 重量 4.3 Weight			160 只/批 160pcs/batch
型式检验 Type inspection		免检项目、出厂检验项目以外的其余指标: Other indicators except exempted inspection item and delivery inspection items. 4.6 直流内阻 4.6 DC internal resistance 5.1.1 最大持续充电电流 5.1.1 Maximum continuous charge current 5.1.6 恒流充电容量比例 5.1.6 Constant current charging capacity ratio. 5.2.1 最大持续放电电流 5.2.1 Maximum continuous discharge current 5.2.2 最大脉冲放电电流 5.2.2 Maximum pulse discharge current 5.2.7 高温放电容量 5.2.7 High temperature discharge capacity 5.2.8 低温放电容量/能量保持率			2 只/项 2pcs/item

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	5.2.8 Low temperature discharge capacity/energy retention rate 5.2.9 倍率放电容量保持率 5.3.1 质量功率密度 5.2.9 C-Rate discharge capacity retention rate. 5.3.1 mass power density 5.3.2 体积功率密度 5.3.3 最大放电功率 5.3.2 volumetric power density 5.3.3 Maximum discharge power 5.3.4 最大反馈功率 5.3.5 冷启动功率 5.3.4 Maximum regen power 5.3.5 Cold cranking power 5.4.2 高温循环寿命 5.4.3 日历寿命 5.4.2 High temperature cycle life 5.4.3 Calendar life 5.5.3 室温荷电保持率 5.5.4 室温容量恢复率 5.5.3 Room temperature charge retention 5.5.4 Room temperature capacity recovery rate 5.5.5 高温荷电保持率 5.5.6 高温容量恢复率 5.5.5 High temperature charge retention 5.5.6 High temperature capacity recovery rate 5.5.7 储存容量恢复率 6.1 过放电 5.5.7 Storage capacity recovery rate 6.1 Over discharge 6.2 过充电 6.3 短路 6.2 Over charge 6.3 Short circuit 6.4 跌落 6.5 加热 6.4 Drop 6.5 Heating 6.6 挤压 6.7 海水浸泡 6.6 Crush 6.7 Seawater immersion 6.8 温度循环 6.9 低气压 6.8 Temperature cycling 6.9 Low Pressure				

8.2 出厂检验判定规则

8.2 Criterion rule of delivery inspection

表 9 电芯等级判定及处理

Tabe9 The grade determination and treatment of cell

电芯等级 Cell Levels	指标要求 Indicator Requirement
A	容量≥105 Ah, <115.5 Ah Capacity≥105 Ah, <115.5 Ah
B	容量≥94.5 Ah, <105 Ah Capacity≥105 Ah, <115.5 Ah
C	容量≥84 Ah, <94.5 Ah

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		Capacity≥105 Ah, <115.5 Ah		
	D	电性能不满足 A、B、C 档要求的电池; 电池厚度≥27.5mm The capacity does not meet the requirements of A, B and C, and the cell thickness is more than 27.5mm		

8.3 型式检验

8.3 Type inspection

8.3.1 产品在下列情况之一时应进行型式检验:

8.3.1 Products should be type inspected in one of the following situations:

a) 新产品投产和老产品转产;

a) Production of new products and transfer of old products;

b) 转厂;

b) Transfer Plant;

c) 停产超过一年后复产;

c) Return to production after halt production for more than one year;

d) 结构、工艺或材料有重大改变。

d) Structure, process or materials have been great changed.

8.3.2 判定规则

8.3.2 Criterion rule

在型式检验中, 若有一项不合格时, 应判定为不合格。

In the type inspection, if one of items cannot meet the requirements, it should be judged to be unqualified.

9 标志、包装、运输、贮存

9 Markings、Package、Transport、Storage

9.1 标志

9.1 Markings

每个产品上应有清晰的条码。

Every product should have a clear bar code

9.2 包装

9.2 Package

产品都应有外包装, 保证产品在运输、装卸、堆放过程中不受机械损伤。

All products should be packed and ensure that products are free from mechanical damage during transportation,

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loading and unloading and stacking.					
9.3 运输					
9.3 Transport					
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。					
Prohibit violent loading and unloading, avoid strong vibration、shock or extrusion and keep away from sunshine and rain during transportation.					
9.4 贮存					
9.4 Storage					
不打开包装的产品应贮存在环境温度为-10℃～30℃，相对湿度≤75%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；应定期进行充电周期不超过 2 个月。					
Product not opened should be stored in a clean, dry, ventilated warehouses with a temperature range of -10℃～30℃,relative humidity ≤75%RH that do not contain corrosive gases; Keep away from fire and heat source. Product shall be charged periodically and the period is not more than 2 months.					

附录 A

Appendix A

(规范性附录)

(Normative appendix)

电池尺寸图

Battery Dimensional Drawing

A.1 电池尺寸见图 A.1

A.1 Battery dimensional drawing as shown in figure A.1

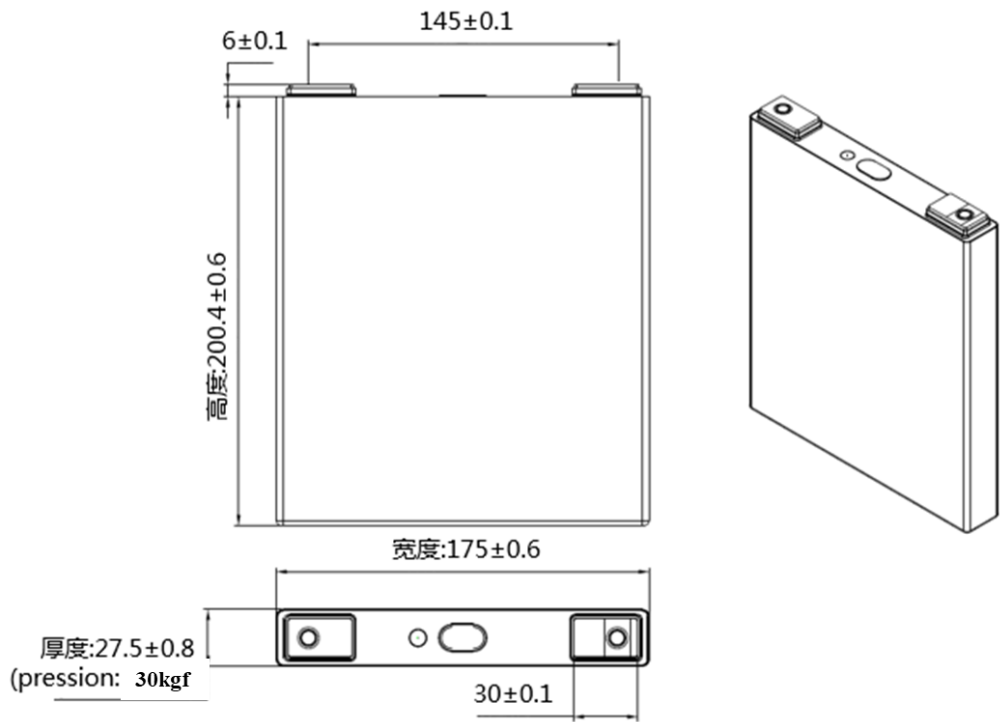


图 A.1 电池尺寸图

Figure A.1 Battery dimensional drawing

A.1 阶梯充电矩阵表

温度	<0℃	0℃≤T<5℃	5℃≤T<15℃	15℃≤T<25℃	25℃≤T<45℃	45℃≤T<50℃	50℃≤T<60℃
充电电流 (C)	不许充电	0.15	0.5	0.6	0.6	0.5	0.33
跳转电压 (V)	/	3.62	3.50	3.40	3.40	3.55	3.60
充电电流 (C)	/	0.1	0.3	0.5	0.5	0.25	0.1



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跳转电压 (V)	/	3.65	3.60	3.50	3.60	3.62	3.65
充电电流 (C)	/	/	0.2	0.2	0.2	0.1	/
跳转电压 (V)	/	/	3.65	3.65	3.65	3.65	/

A.2 单体电芯故障阈值(建议值)

A.2.1 为 Pack 设计提供的电池信息

电池型号:	符号	数值	意见	参考
最大允许压力	Fmax	TBD		250kgf, 5%SOC
最小要求压力	Fmin	TBD		50kgf, 5%SOC

A.3 在选定条件下的循环寿命

A.3.1 常温循环寿命

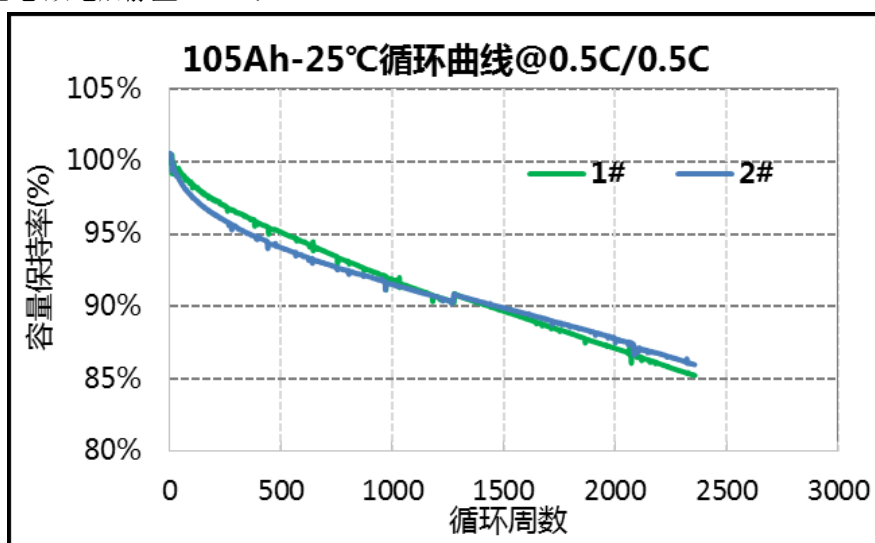
测试条件

充电: 0.5C 充电至 3.65V, 转恒压充电至 0.05C 电流截止

放电: 0.5C, 截止电压 2.0V 夹具力: 100~150kgf

温度: 25°C

静置时间: 充电/放电后静置 30min;



A.3 SOC-OCV 表

T	55°C	45°C	25°C	10°C	0°C	-10°C	-20°C	-30°C
DOD	(V)	(V)	(V)	(V)	(V)	(V)	(V)	(V)
0	3.406	3.395	3.384	3.402	3.391	3.392	3.370	3.392
5	3.335	3.392	3.329	3.325	3.319	3.320	3.321	3.341
10	3.332	3.330	3.328	3.324	3.319	3.311	3.299	3.291
15	3.331	3.330	3.328	3.325	3.319	3.311	3.298	3.288
20	3.331	3.330	3.328	3.325	3.319	3.312	3.297	3.286
25	3.331	3.329	3.327	3.324	3.319	3.311	3.295	3.284
30	3.331	3.329	3.327	3.324	3.318	3.309	3.292	3.282
35	3.330	3.328	3.326	3.322	3.314	3.304	3.289	3.280
40	3.321	3.320	3.318	3.310	3.304	3.298	3.286	3.278
45	3.302	3.300	3.297	3.294	3.292	3.291	3.284	3.276
50	3.298	3.294	3.290	3.286	3.285	3.286	3.280	3.274



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total

	2017	2018	2019	2020	2021	2022	2023	Total
55	3.297	3.293	3.288	3.284	3.281	3.282	3.278	3.273
60	3.297	3.292	3.288	3.283	3.280	3.279	3.275	3.271
65	3.296	3.292	3.287	3.283	3.280	3.277	3.273	3.269
70	3.285	3.285	3.285	3.282	3.279	3.276	3.271	3.268
75	3.267	3.271	3.275	3.280	3.278	3.274	3.269	3.266
80	3.251	3.254	3.256	3.271	3.275	3.273	3.267	3.262
85	3.225	3.227	3.228	3.253	3.268	3.271	3.263	3.260
90	3.208	3.208	3.209	3.228	3.253	3.268	3.258	3.257
95	3.154	3.153	3.152	3.205	3.234	3.262	3.254	3.253
100	2.586	2.682	2.779	3.195	3.207	3.252	3.242	3.211