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Specification Approval Sheet

锂离子电池规格承认书

客户编号/Customers No.: _____

型号/Model: 11116165

类别/Type: 多元复合锂

制定人 Prepared by	审核人 Checked by	批准人 Approved by
业务接收		
客户承认 Customer Approval	公司名/Company Name:	
	客户签名/Customers Signature:	

规格书修订记录

History of specification

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1. Scope
适用范围

This document describes the Product Specification of the Lithium-Polymer (LIP) rechargeable battery cell supplied by Jiangsu Zhitai New Energy Technology Co.,Ltd.).

本规格说明书描述了江苏智泰新能源科技有限公司（以下简称智泰）生产的可充电聚合物锂离子电池的产品性能指标

2. Model: 20Ah-11116165
型号: 20Ah-11116165
3. Specification
产品规格

No.	Items	Specifications
1	Material system 材料体系	LMO/NCM 锰酸锂/三元
2	Charge cut-off voltage 充电截止电压	4.20V
3	Nominal cut-off voltage 标称电压	3.7V
4	Discharge cut-off voltage 放电截止电压	2.75V
5	Delivery voltage 交货电压	3.80-3.90V
6	Rated Capacity 标称容量	20.0Ah @ 0.5C Discharge(放电)
7	Standard Charging method 标准充电方式	0.5C CC,CV charge to 4.20V ,0.05C cut Off,5h limit.(0℃~45℃) 0.5C 恒流恒压充电至 4.2V, 截止电流 ≤0.05C, 限时 5h。(0℃~45℃)
8	Standard discharging method 标准放电方式	0.5C constant current discharge to 2.75V 0.5C 恒流放电至 2.75V
9	Max Continuous Charge Current 最大持续充电电流	0.5C (充电温度 0℃~45℃)
10	Max Continuous Discharge Current 最大持续放电电流	1.0C (continuous current 持续电流, 工作温度-20~55℃)
11	Operating temperature 工作温度	Charging 充电: 0℃~45℃ Discharging 放电: -20℃~55℃
12	Cell Internal Impedance 单电芯内阻	≤ 3.0mΩ Internal resistance measured at AC 1KHZ after 40% charge 40%电态下用交流法测量内阻

13	Cell Weight 电池重量	Approx 约: 425.0±15.0g
14	Criterion of making sets 配组标准	Voltage gap: ≤10mV 电压差: ≤10mV
		Internal resistance gap: ≤0.3mΩ 内阻差: ≤0.3mΩ
		Capacity gap: ≤200mAh 容量差: ≤200mAh
15	standard voltage decline 压降标准	≤0.05mV/h after 6 days aging at natural temperature 常温老化 6 天后

4. Battery Cell Performance Criteria
电芯性能检查及测试
4.1 Electrical characteristics
电性能

No.	Items	Test Method and Condition	Criteria
1	Rated Capacity 检测容量	The capacity means the discharge capacity of the cell, which is measured with discharge current of 0.5C with 2.75V cut-off voltage after standard charge. 该容量是指标准充电后, 0.5 C 放电至 2.75V 截止电压所放出的容量。	≥20.0Ah
2	Cycle Life 循环寿命 (23±2℃)	Test condition: Charge:0.5 C to 4.20V Discharge:0.5 C to 2.75V 80% or more of 1st cycle capacity at 0.5C discharge of operation. 测试条件: 充电: 0.5 C 充电到 4.20V 放电: 0.5 C 放电到 2.75V 当放电容量降至初始容量的 80%时, 所完成的循环次数定义为该电芯的循环寿命。	≥1000 次
3	RT storage performance 室温存储性能	After the standard charging, storied the cells under the condition as No.4.4 for 28 days, then measured the capacity with 0.5C till 2.75V . 标准充电后, 在 No.4.4 条件下贮存 28 天, 再以 0.5C 放电至 2.75V 所放出的容量。	Residual capacity >95% 剩余容量>95%
4	Initial impedance 初始内阻	Internal resistance measured at AC 1KHz after 40% charge 半充状态下, 测量其 AC 1KHz 下的交流阻抗	≤3.0mΩ
5	Cell Voltage 电芯电压	As of shipment. 出货状态	3.80 -3.90V
6	Temperature Characteristics 温度特性	1. According to item 4.1.1, at 23±5℃. 2. Capacity comparison at each temperature, measured with constant discharge current 0.5C with 2.75V cut-off. Percentage as an index of the capacity compared with 100% at 23℃ 3. The storage time under the condition of test according to GB/T 1.在 23±5℃条件下, 用 4.1.1 方法将电芯充电。 2.在不同温度条件下, 用 0.5C 的电流恒流放电至 2.75V。以 23℃ 时放电容量为基准计算百分比。(0℃, -20℃截止电压 2.5V) 3.测试前电芯在测试条件下的搁置时间参考国标	-20℃: ≥70% 0℃: ≥85% 23℃ :=100% 45℃: ≥95%
7	High temperature storage performance 高温存储性能	1. According to item 4.1.1, at 23±5℃. 2. The battery under the condition of 55 +/- 5℃ storage 7 days, at room temperature for 5 H to 0.5 C discharge current until after termination voltage; 0.5C charging again, then 0.5C discharge current until termination voltage. 1. 在 23±5℃条件下, 用 4.1.1 方法将电芯充电。 2.将电池在 55±5℃条件下贮存 7d, 在室温下搁置 5h 后以 0.5C 电流放电直至终止电压; 再按 0.5C 充电后, 以 0.5C 电流放电直至终止电压。	Retained Capacity ≥90% 容量保持≥90% Capacity recovery rate of 95% or higher 容量恢复≥95%

4.2 Mechanical characteristics

机械特性

No.	Items/项目	Test Method and Condition/测试方法和条件	Criteria/判定标准
1	Vibration test 振动测试	After standard charging, fixed the cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz an 55Hz, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes. 将标准充电后的电芯固定在振动台上，沿 X、Y、Z 三个方向各振动 30 分钟，振幅 1.6mm，振动频率为 10Hz~55Hz，每分钟变化 1Hz。	No fire, no leakage. 无起火、无漏液
2	Drop Test 跌落测试	The after standard charge from a height of 1 meters down to fall to the thickness of the hard board with thickness of 20mm, X, Y, Z from the positive and negative direction (six directions) in each direction, free fall 1. 将标准充电后的电芯从 1 米高度跌落至跌落到厚度为 20mm 厚的硬木板上,从 X、Y、Z 正负方向（六个方向）每个方向自由跌落 1 次。	No fire, no leakage. 无起火、无漏液
3	Thermal exposure test 高温热冲击测试	After the temperature of the fully charged battery is stabilized to normal temperature, put it into the circulating air oven.After rising to 130 °C at a rate of 3-5 °C per minute from room temperature, place at 130 °C for 60 minutes. 充满电的电池温度稳定到常温后，放入循环空气烘箱里。从常温开始以 3-5°C/min 的速率升至 130°C 后，在 130°C 放置 60 分钟。	No explosion, No fire. 无起火,无爆炸
4	Short test 短路测试	Under standard test conditions, connect the positive and negative lears of a fully charged battery with a load of 60 to 100 mOhms, short-circuiting the external battery until the voltage drops to 0.02V. 在标准测试条件下，将充满电的电池的正负极与 60 - 100 毫欧的负载连接起来，使外部电池短路直到电压降至 0.02V。	No explosion, No fire. The Temperature of the Battery surface not exceeded than 150°C 无起火,无爆炸。 电池表面温度不超过 150°C
5	Over discharge test 过放电测试	After 0.5C is fully charged, discharge at 1C for 60min and observe for 1 hour. 0.5C 充满电后，1C 放电 60min，观察 1 小时。	No explosion, No fire, No leakage 无爆炸，无起火，无漏液
6	Over charge test 过充电测试	Let it stand for 1 hour after charge to full charging at 0.5C,constant current and constant voltage charge to 5V and keep for 90 minutes. 0.5C 充满电后放置 1 小时,恒流恒压充电至 5V 并保持 90 分钟。	No explosion, No fire. 无起火,无爆炸

7	Crush test 挤压测试	After 0.5C is fully charged,a half cylinder with a radius of 75mm was used to form a (5 ± 1) mm / s is perpendicular to the battery pressure.When the battery voltage reaches 0V or the deformation reaches 30% or the extrusion force reaches 30KN, hold for 5min, stop extrusion and observe for 1H. 0.5C 充满电后,用半径为 75mm 的半圆柱体,以 (5 ± 1) mm/s 的速度垂直于电池施压。当电池电压达到 0V 或变形量达到 30%或挤压力达到 30KN 时, 保持 5min 后, 停止挤压, 观察 1h。	No explosion, No fire. 无起火,无爆炸
8	Seawater immersion 海水浸泡	After 0.5C is fully charged,all immersed in 3.5% brine concentration, to maintain a minimum of 2h or until thermal runaway when to stop, observe 1h. 电池 0.5C 充满电后,全部沉浸在浓度 3.5%的盐水中,保持 2 小时以上或直到发生热失控时停止,观察 1 小时。	No explosion, No fire. 无起火,无爆炸
9	Temperature cycle 温度循环	After 0.5C is fully charged,Put the battery in 25 °C /-40 °C, 25 °C / 75 °C condition transformation temperature, after recycle 5 times. observe 1h. 电池 0.5C 充满电后,将电池放入 25°C/-40°C、25°C/75°C 环境条件下转换温度搁置,重复 5 次。观察 1 小时。	No explosion, No fire, No leakage 无爆炸,无起火,无漏液

4.3 Visual inspection

外观检查

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.
不允许有任何影响电芯性能的外观缺陷, 诸如裂纹、裂缝、泄漏等。

4.4 Standard environmental test condition

标准测试环境

Unless otherwise specified, all tests stated in this Product Specification are conducted at below condition:

Temperature: $23 \pm 5^\circ\text{C}$

Humidity: $65 \pm 20\%RH$

除非特别说明, 本标准书中所有测试均在以下环境条件下进行:

温度: $23 \pm 5^\circ\text{C}$

湿度: $65 \pm 20\%RH$

5. Storage and Others

贮存及其它事项

a) Long Time Storage

If the Cell is stored for a long time, the cell's storage should be 3.6~3.85V and the cell is to be stored in a condition as No.4.4.

长期贮存

长期贮存的电池(超过 3 个月)须置于干燥、凉爽处。贮存电压为 3.6~3.85V 且贮存环境要求如 4.4。

b) Others

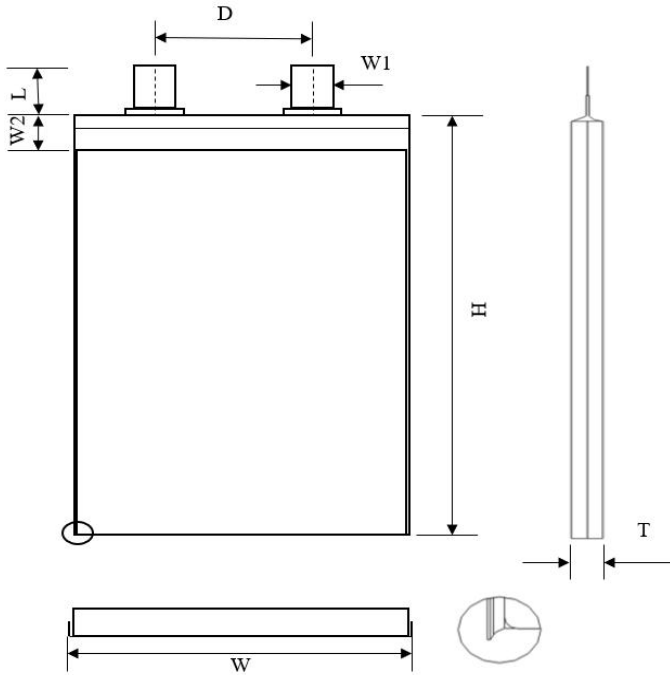
Any matters that this specification does not cover should be conferred between the customer and ZhiTai.

其它事项

任何本说明书中未提及的事项, 须经双方协商确定。

6.Drawing (all unit in mm, not in scale)

外形尺寸 (单位: mm;未按比例)



项目 Item	代码 Code	规格(mm) Specification	备注 Remark
厚度 Thickness	T	10.2±0.2	
宽度 Width	W	115.5 ^{+0.5} _{-1.0}	
高度 Height	H	164.5 ^{+0.5} _{-2.0}	不含极耳
极耳长度 Tab-Lead Length	L	20±1	极耳外露尺寸
极耳宽度 Tab-Lead Width	W1	20±0.1	
极耳中心距 Tab-Lead Distance	D	58±1.5	
顶封宽度 Top Seal Width	W2	12±0.5	参考值

7. Notice & Warning
安全使用注意事项

7.1 Don't disassemble, damage, short-circuit, heat, wet or cremate batteries.

禁止拆装、破坏、短路、加热、弄湿、焚烧电池;

7.2 Use specified charger, and connect the battery to the appliance correctly.

使用专用充电器, 并正确与专用设备连接使用;

7.3 Don't plug the battery directly in electrical outlet. Don't use the cell together with other types of batteries. If the battery is abnormal in shape or performance, reject it.

严禁将电池直接接在电源插座, 禁止与其它电池混用; 严禁使用不正常电池。

7.4 Don't treat rejected battery as regular living garbage. Collect them in certain place for recycle.

废弃电池请安全妥当处理 (如回收)。不可将电池作为生活垃圾处理。