Specification Approval Sheet

产品规格书

Customer Name/客户名称: _____

Customer Model/客户型号: _____

Model/型号: **21700**

Capacity/容量: **4000mAh**

Date/日期: **2021/6/16**

Prepared by 编制	Checked by 审查	Approved by 批准
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Customer Approved (Stamp) 客户承认 （盖章）	Test by 测试	Checked by 审核	Approved by 批准

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Amendment Records

修正记录

Revision 版 本	Description 记 述	Prepared By 编 制	Approved By 批 准	Date 日 期
A/0	First Publish			2021/6/16

Content/目录

1. Scope/范围

This specification defines the technical requirements for Lithium ion battery supplied by Camelion Battery Co., Ltd..

本规格书适用于深圳市飞狮电池有限公司提供的锂离子电池

2. Model/型号

Cell Model/电芯型号　INR21700 4000

3. Reference Standard/参照标准

GB/T 18287、GB/T31241、UL1642 、IEC61960、IEC62133

4. Cell Specification/电芯产品规格

No.	Item	General Parameter	Remark
1.	Typical capacity 典型容量	4000mAh	0.2C 充放电至终止电压 0.2C charge and discharge for cut-off
2	Minimum Capacity 最小容量	3900mAh	
3	Nominal Voltage 标称电压	3.7V	
4	Internal Impedance 内阻	≤15mΩ	标准充电后 AC 1KHz 测试
5	Single battery weight 单支电池重量	Approximately/约 68g	
6	Limited charge current 充电限制电压	4.20V	
7	Cut-off Voltage 放电限制电压	2.5 V	
8	Standard charge current 标准充电电流	800mA	0.2C
9	Max charge current 最大充电电流	6000mA	
10	Standard dis-charge current 标准放电电流	800mA	0.2C
11	Max Continuous discharging current 最大持续放电电流	35A	
12	Operating Temperature 工作温度	10℃~+20℃	Max Charging 2A 最大充电 2A

		20℃~+45℃	Max Charging 6A 最大充电 6A
		-20℃~+80℃	Discharging 放电
13	Storage Temperature 贮存温度	-20℃ / +45℃	Less than 3 month 小于 3 个月
		0℃ / +25℃	Less than 12 months 小于 12 个月
14	(电芯尺寸） Cell Dimension	Height（高度） ≤71mm	Initial Dimension （初始尺寸）
		Diameter（直径） ≤21.8mm	

4. Product Endurance/产品耐受性

No. 序号	Items 项目	Test Method and Condition 测试条件	Criteria 标准
1	Charge 充电模式	Charge to 4.2V at constant current 0.2C, then constant voltage charge to taper current 0.02C 0.2C 恒流充电至 4.2V，然后恒压充电至 0.02C	The cell shall be charge at 25±2℃. 25±2℃环境下充电
2	Discharge 放电模式	After standard charge, the cell shall be discharge till the voltage discharge to 2.5V by 0.2C, 标准充电后，0.2C 放电至 2.5V,截止	The cell shall be discharge at 25±2℃. 25±2℃环境下放电电
3	Cycle Life 循环寿命	Charge: 4A Discharge: 20A Rest: 60min Repeat the procedures 300 cycles （1）充电过程：4A； （2）放电过程：20A。 （3）搁置：60 分钟 重复以上步骤 300 次。	ResidueCapacity≥60% 剩余容量≥60%
4	Discharge rate capabilities 放电倍率性能	Standard charged under the condition of normal atmospheric pressure and the environmental temperature of 23℃±3℃ and 45%-85%RH, then rest for 30mins and discharge at 0.8A/2A/20A/30A/35A to the discharge	0.8A≥3900mAh 2A≥3820mAh 20A≥3700mAh 30A≥3600mAh 35A≥3450mAh

		cut-off voltage respectively. Charge/discharge cycle can be conducted for 3 times before meeting the Standards(the same below 在 1 标准大气压，环境温度 23℃±3℃，相对湿度为 45%-85%的条件下，电池标准充电后，搁置 30min，分别以 0.8A/2A/20A/30A/35A 进行放电至终止电压，循环 3 次，当有一次达到标准，即达到标准要求) (percentage index of the discharge an 25℃ at 0.5C is 100% 以 0.5C 电流 25℃下放电容量为 100%计算)	
5	Charged Storage Characteristics 荷电保持能力	The cell or battery charged with standard charge mode, Open circuit stored in 20±5℃ for 28 days. Discharged with standard discharge mode. 将电池或电池组按标准充电模式充电后，开路放置在 20±5℃环境温度下 28 天 天后。	Discharge time should not be less than 47h Then charged with Standard Charge mode, Discharged with standard discharge mode again. Discharge time should not be less than 4.9h. 以标准放电模式进行放电， 放电时间应不低于 4.7 小时,再次以标准充电模式充电后以标准放电模式放电，放电时间应不低于 4.9 小时。

5. Mechanical characteristics and Safety Test/安全测试及机械特性

No. (序号)	Items （项目）	Test Method and Condition （测试方法及条件）	Criteria （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 leakage 无泄漏 No fire 不起火
2	Drop Test 跌落测试	The cell is to be dropped from a height of 1 meter twice onto concrete ground. 将标准充电后的电芯从 1 米高度跌落至混凝土地面 2 次	No explosion, No fire, no leakage. 无爆炸、无起火 、无泄漏

3	Short Circuit （短路试验 20℃）	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1Ω.Tests are to be conducted at room temperature(20±2℃). （在常温下约 20±2℃依次把每个样品电池的正负极用铜线连接起来使电池外部短路--线路总电阻不超过 0.1Ω）	No explosion, No fire The Temperature of the surface of the Cells are lower than 150℃ (无起火无爆炸 电池表面温度应低于 150℃)
4	Short Circuit （短路试验 60℃）	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1Ω.Tests are to be conducted at temperature(60±2℃). （在常温下约 60±2℃依次把每个样品电池的正负极用铜线连接起来使电池外部短路--线路总电阻不超过 0.1Ω）	No explosion, No fire The Temperature of the surface of the Cells are lower than 150℃ (无起火无爆炸 电池表面温度应低于 150℃)
5	过充电测试 Overcharge testing	充满电的电池外接 1C/4.6V 的电源给电池持续加载 1.5 小时。 1C/4.6V DC power supply charge 1.5hrs after fully charge	不起火，不爆炸，不冒烟 No fire, no explode, no smoke

6. Handling Precautions and Guideline For Lithium-Ion Rechargeable Batteries/锂离子充电电池操作指示

6.1 Charging/充电

6.1.1 Charging current/充电电流

Charging current should be less than maximum charge current specified in the Product Specification. Charging with higher current than recommended value may cause damage to cell electrical, mechanical, and safety performance and could lead to heat generation or leakage.

充电电流不得超过本规格书中规定的最大充电电流。使用高于推荐值电流充电将可能引起电芯的充放电性能、机械性能和安全性能的问题，并可能会导致发热或泄漏。

6.1.2 Charging voltage/充电电压

Charging shall be done by voltage less than that specified in the Product Specification . which is the absolute maximum voltage, must be strictly prohibited. The charger shall be designed to comply with this condition. It is very dangerous that charging with higher voltage than maximum voltage may cause damage to the cell electrical, mechanical safety performance and could lead to heat generation or leakage.

充电电压不得超过本规格书刊号中规定的额定电压。充电器的设 计应满足此条件。电池电压高于额定 电压值时，将可能引起电芯的充放电性能、机械性能和安全性能的问题，可能会导致发热或泄漏。

6.1.3 Prohibition of reverse charging/禁止反向充电

Reverse charging is prohibited. The cell shall be connected correctly. The polarity has to be confirmed before wiring. In case of the cell is connected improperly, the cell cannot be charged.Simultaneously, the reverse charging may cause damaging to the cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

正确连接电池的正负极，严禁反向充电。若电池正负极接反，将无法对电芯进行充电。同时，反向充电会降低电芯的充放电性能、安全性，并会导致发热、泄漏。

6.2 Discharging/放电

6.2.1 Discharging current/放电电流

The cell shall be discharged at less than the maximum discharge current specified in the Product Specification. High discharging current may reduce the discharging capacity significantly or cause over-heat.

放电电流不得超过本规格书规定的最大放电电流，大电流放电会导致电芯容量剧减并导致过热。

6.2.2 Over-discharging/过放电

It should be noted that the cell would be at an over-discharged state by its self-discharge characteristics in case the cell is not used for long time. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.75V and3.95V.

需要注意的是，在电池长期未使用期间，它可能会用其自放电特性而处于某种过放电状态。为防止过放电的发生，电池应定期充电，将其电压维持在 3.75V 至 3.95V 之间。

Over-discharging may causes loss of cell performance, characteristics, or battery functions.

过放电会导致电芯性能、电池功能的丧失。

6.3 Prtection Circuit Module/保护电路模块

The cell/battery pack shall be with a PCM that can protect cell/battery pack properly. PCM shall have functions of (1) overcharging prevention ,(2) over-discharging prevention,(3) over current prevention to maintain safety and Prevent significant deterioration of cell performance. The over current can occur by external short circuit

电芯/电池包装应配有 PCM 以正确保护电芯/电池。PCM 应具有以下功能以保证安全并防止损坏电池性能：

(1) 过充保护功能；（2）过放保护功能；（3）过流保护

7. Cautions In Use/使用注意事项

To ensure proper use of the battery please read the manual carefully before using it.

为确保正确使用电池，使用前请仔细阅读本细则

Handling/电池操作

Do not expose to, dispose of the battery in fire.

不要靠近和放置电池于火中

Do not put the battery in a charger or equipment with wrong terminals connected.

在充电器或设备仪器中不要把电池接错电极

Avoid shorting the battery

避免电池短路

Avoid excessive physical shock or vibration.

避免电池过多的物理撞击和震动

Do not disassemble or deform the battery.

不要解剖和使电池变形

Do not immerse in water.

不要把电池浸泡在水中

Do not use the battery mixed with other different make, type, or model batteries.

不要和其它不同类型的电池混和使用

Keep out of the reach of children.

放置电池于儿童不易接触的地方

charge and discharge（充电和放电）。Battery must be charged in appropriate charger only.

电池必须用适当的充电器充电

Never use a modified or damaged charger.

不要使用改装或损坏的充电器

Do not leave battery in charger over 24 hours.

不要把电池放置于充电器超过 24h

Storage/储存：

Store the battery in a cool, dry and well-ventilated area.

应把电池置于凉爽、干燥及通风良好的区域

Disposal/电池处理：

Regulations vary for different countries. Dispose of in accordance with local regulations.

电池处理要符合当地的规定

8. Period of Warranty/保质期

The period of warranty is one year from the date of shipment. Camelion guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customer abuse and misuse.

电池的保质期从出货之日算起为一年。如果电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。