Specification Approval Sheet(Cell)
產品規格確認書（電芯）

Model： JP 904580

型 號： JP 904580

Date ： 2019-06-20

日 期： 2019-06-20

Prepared by 編制	Reviewed by 審核	Approved by 批准

Customer Approved 客戶確認	Signature: 簽名:
	Date: 日期:
	Company Name: 公司名稱:
	Company Stamp: 公司蓋章:

敬請蓋印認規格之後，將 1 份交回本公司，謝謝！

Please return one copy with signature and your company's stamp to us if approved. Thank you!

AMENDMENT RECORDS

變更記錄

版本 Revision	描述 Description	日期 Date	批准 Approval
A/0	新版發行	2019-06-20	羅強

1. Scope/使用範圍

This document describes the Product Specification of the Lithium-Polymer (LIP) rechargeable battery cell supplied by SHENZHEN JINGXIAN BATTERY TECHNOLOGY CO.,LTD.

適用範圍本規格說明書描述了深圳市敬贤电池科技有限公司生產的可充電聚合物鋰離子電池芯的產品性能指標。

2. Cell specification/電芯規格

NO. 編 號	Items 項目	Specifications 描述		Note 備註
1	Voltage 電壓	充電電壓 Charge voltage	4.2V	
		最大充電電壓 Maximum charge voltage	4.25V	
		放電截止電壓 Discharge cut-off voltage	3.0V	
		標稱電壓 Normal voltage	3.7V	
2	Current 電流	標稱充電電流 Standard charge current	0.2C	
		最大充電電流 Maximum charge current	1.0C	
		標稱放電電流 Standard discharge current	0.2C	
		最大放電電流 Maximum discharge current	1.0C	
3	Typical rated capacity 標稱容量	4000mAh @ 0.2C discharge 0.2C 放電容量 4000mAh		Cut-off voltage：3.0V 截止電壓：3.0V
	Minimum rated capacity 最小容量	4000mAh @ 0.2C discharge 0.2C 放電容量 4000mAh		
4	Charge time 充電時間	標準充電時間 Normal charge time	8.0hours（Ref.）	Charge current：0.2C 充電電流：0.2C
		最大充電時間 Maximum charge time	3.0hours（Ref.）	Charge current：1.0C 充電電流：1.0C
6	Operating temperature and humidity range 工作環境溫度和濕度	Charge/充電：Temperature 溫度 0～45℃ humidity 濕度 85%RH		
		Cell surface temperature 電芯表面	Charge current 充電電流	
		0℃～20℃	≤0.2C	
		20℃～45℃	≤1.0C	
		Discharge/放電：Temperature 溫度 -20～60℃ humidity 濕度 85%RH		
		Cell surface temperature 電芯表面	Discharge current 放電電流	
		-20℃～0℃	≤0.2C	
		0℃～15℃	≤0.5C	
		15℃～60℃	≤1.0C	
7	Storage temperature 儲存溫度	Less than 1 month 一個月	Temperature：-10℃～40℃ 溫度：-10℃～40℃	
		Less than 6 months 六個月	Temperature：-10℃～30℃ 溫度：-10℃～30℃	
		Recommended 建議	Temperature：15℃～25℃ 溫度：15℃～25℃	
8	Cell weight 電芯重量	Approx：72.0g 大 約：72.0g		

9	Initial impedance 初始阻抗	Internal resistance measured at AC 1KHz after 50% charge. 電芯半充電後在 1KHz 下测試電芯内部阻抗。	≤40mΩ

3. Cell performance criteria/電芯性能標準

3.1. Visual inspection/外觀

There shall be no such defect as scratch, flaw, crack, and leakage, which may adversely affect commercial value of the cell.

電芯表面沒有刮痕、瑕疵、裂紋、洩露等能影響電芯常規性能的缺陷。

3.2. Standard environment test condition/標準環境測試條件

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

除非有另外規定，所有測試條件都要遵循以下條件：

Temperature:23±5℃ 溫度：23±5℃ Humidity:65±20%RH 濕度：65±20%RH

3.3. Electrical characteristic/電性能

<table>
<tr><th>NO.
編號</th><th>Items
項目</th><th colspan="5">Test method and condition
測試方法和條件</th><th>Criteria
標準</th></tr>
<tr><td>1</td><td>Standard charge method
標準充電方法</td><td colspan="5">Charge the cell with constant current at 0.2C to reach 4.2V. After the cell with constant voltage at 4.2V till the charging current declines to 0.02C.
以 0.2C 的電流恒流充電至 4.2V，轉 4.2V 恒壓充電，直至充電電流下降到 0.02C。</td><td></td></tr>
<tr><td>2</td><td>Standard discharge method
標準放電方法</td><td colspan="5">The discharge method of the cell, which is measured with discharge current of the 0.2C with 3.0V cut-off voltage after the standard charge.
電芯標準放電方法是標準充電後以 0.2C 的電流放電，到 3.0V 所得</td><td></td></tr>
<tr><td>3</td><td>Rated discharge
倍率容量</td><td colspan="5">The capacity means the discharge capacity of the cell, which is measured with discharge current of the 0.2C with 3.0V cut-off voltage after the standard charge.
電芯放電容量是指標準充電後以 0.2C 的電流放電，到 3.0V 所得到的容量。</td><td>≥4000mAh</td></tr>
<tr><td>4</td><td>Cycle Life
迴圈壽命</td><td colspan="5">Cycle life is the capacity of the cell that was repeated 300 cycles with the standard charge and then discharge to 3.0V with discharge current of 0.5C.
迴圈壽命是測量電芯標準充電後 0.5C 放電至 3.0V，充放電重複 300 次後的放電容量。</td><td>≥ 80% Minimum rated discharge</td></tr>
<tr><td>5</td><td>Self-discharge
自放電</td><td colspan="5">After the standard charging, capacity after 30 days storage, measured under the same condition as item 4.2 with discharge current of the 0.2C with 3.0V cut-off voltage.
標準充電後，電芯在 3.2 相同的條件下測試電芯存放 30 天后，以 0.2C 放電到 3.0V 所得到的容量。</td><td>Residual capacity≥85%
殘餘容量≥85%</td></tr>
<tr><td>6</td><td>Cell voltage 出貨電壓</td><td colspan="5">As of shipment 出貨電壓</td><td>≥3.8V</td></tr>
<tr><td rowspan="3">7</td><td rowspan="3">Temperature Characteristic
溫度特性</td><td colspan="5">Capacity comparison at each temperature, measured with constant discharge current 0.2C to 2.75V cut-off after complete charge at 23℃. If charge and discharge temperature in not the same, the interval for temperature change comes to 3 hours. Percentage as an index of the capacity compared with 100% at 25℃.
23℃充電完成後在不同的溫度下以 0.2C 恒流放電至 2.75V 測試容量，如果充電溫度和放電溫度不同，不同溫度之間轉換間隙為 3 小時。以 25℃的容量為 100%做基數。
Discharge capacity/放電容量</td><td></td></tr>
<tr><td>Charge Temperature
充電溫度</td><td colspan="4">Discharge temperature
放電溫度</td><td></td></tr>
<tr><td>-10℃</td><td>0℃</td><td>25℃</td><td>45℃</td><td></td></tr>
<tr><td></td><td>23℃</td><td>≥60%</td><td>≥80%</td><td>≥100%</td><td>≥98%</td><td></td></tr>
</table>

3.4 Mechanical specification/機械性能

NO. 編號	Items 項目	Test method and condition 測試方法和條件	Criteria 標準
1	Vibration test 振動測試	Cell（as of shipment） vibrated for 90minutes for each of the three mutually perpendicular planes with total excursion of 1.15mm and with frequency of 10Hz to 55Hz. 電芯在三個相互垂直方向以 1.15mm 振幅，頻率為 10-55Hz 振動 90 分鐘。	No leakage Capacity recovery rated: ≥90%.（stand by 3 hours） 無洩漏，容量恢復≥90%（擱置 3H）
2	Drop test 跌落測試	The cell is to be dropped from a height of 1 meter 2 times on to concrete ground. 電芯由 1 米高跌路至混凝土地面 2 次。	No explosion, No fire, No leakage 不爆炸、不起火、不洩漏
3	Heat test 高溫	The temperature of the baking box which contains cell is raised to 130±2℃ at a rate of 5℃/min and then held for ten minutes. 標準充電後的電芯放入以 5℃/min 恒溫速率升至 130±2℃，並在 130±2℃溫度下保持 10min。	
4	Over-charge test 過充電	The cell is overcharged to 4.8V with a current of 1C and held for 8 hours. 電芯在 1C 恒流恒壓下過充至 4.8V，並保持 8H	

4. Storage and Others/存放和其它

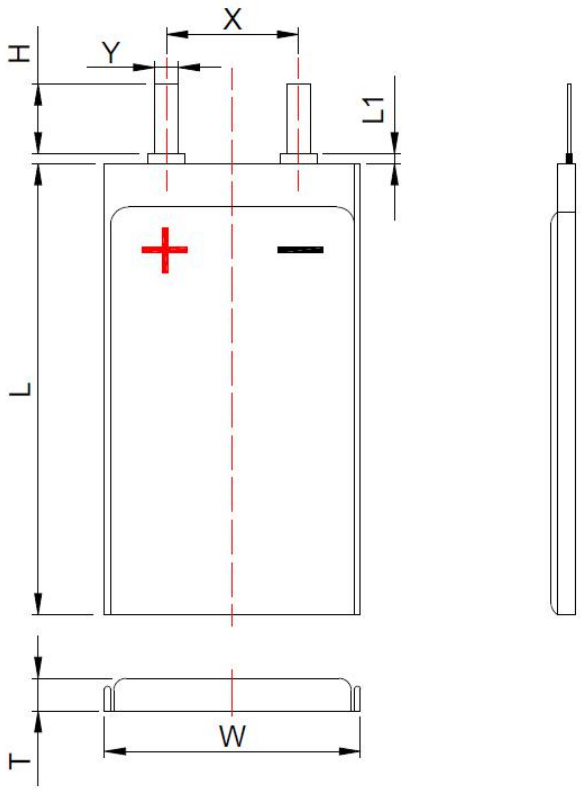
4.1 Long Time Storage/長期存放

If the cell is stored for a long time, the cell’s storage voltage should be 3.6V～3.9V and the cell is to be stored in a condition as Item.4.2

4.2 Others/其它

Any matters that this specification does not cover should be conferred between the customer and JINGXIAN.
此規格書任何沒有涉及的條件，客戶應需和敬贤協商確定。

5. Cell dimension (All unit in mm, not in scale)
電芯尺寸（單位：mm，未按比例）



Items 項目	Description 描述	Dimension and Specification 尺寸和規格
H	Tab length 極耳長度	8.0±2.0mm
X	Distance between 2 tabs 極耳中心距	21.7±2.0mm
Y	Tab width 極耳寬度	5.5±0.1mm
T	Cell thickness 電芯厚度	9.0mm(Max)
W	Cell width 電芯寬度	45.0mm(Max)
L	Cell length 電芯長度	80.0mm(Max)

Appendix/附錄

Handling Precautions and Guideline
For LIP(Lithium-Ion Polymer)Rechargeable Batteries
聚合物鋰離子充電電芯操作指示及注意事項

Subject to change without notice
如有變化無需另補通知

Preface/引言

This document of Handling Precautions and Guideline LIP Rechargeable Batteries shall be applied to the battery cells manufactured by JINGXIAN.

本檔“聚合物鋰離子充電電芯操作指示及注意事項”僅適用敬贤电池科技有限公司生產的電芯。

Note(1)/ 聲明一

The customer is requested to contact JINGXIAN in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

客戶若需要將電芯用於超出檔規定以外的設備，或在檔規定以外的使用條件下使用電芯，應事先聯繫敬贤电池，因為需要進行特定的實驗測試以核實電芯在該使用條件下的性能及安全性。

Note(2)/ 聲明二

JINGXIAN will take no responsibility for any accident when the cell is used under other conditions than those described in this Document.

對於在超出檔規定以外的條件下使用電芯而造成的任何意外事故，敬贤电池科技有限公司概不負責。

Note(3)/ 聲明三

JINGXIAN will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the cell, if it is deemed necessary.

如有必要，敬贤电池科技有限公司會以書面形式告之客戶有關正確操作使用電芯的改進措施。

1. Charging/充電

1.1 Charging current/充電電流

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.

充電電流不得超過本標準書中規定的最大充電電流。使用高於推薦值電流充電將可能引起電芯的充放電性能、機械性能和安全性 能的問題，並可能會導致發熱或洩漏。

1.2 Charging voltage/充電電壓

Charging shall be done by voltage less than that specified in the Product Specification (4.2V/cell). Charging beyond 4.25V, 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.

充電電壓不得超過本標準書中規定的額定電壓（4.2V/電芯）。4.25V 為充電電壓最高極限，充電器的設計應滿足此條件。

電芯電壓高於額定電壓值時，將可能引起電芯的充放電性能、機械性能和安全性能的問題，可能會導致發熱或洩漏。

1.3 Charging temperature/充電溫度

The cell shall be charged within 0℃~45℃ range in the Product Specification.

電芯必須在 0℃~45℃的環境溫度範圍內進行充電。

1.4 Prohibition of reverse charging/禁止反向充電

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.

正確連接電池的正負極，嚴禁反向充電。若電池正負極接反，將無法對電芯進行充電。同時，反向充電會降低電芯的充放電性能、安全性，並會導致發熱、洩漏。

2. Discharging/放電

2.1 Discharging current/放電電流

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.

放電電流不得超過本標準書規定的最大放電電流，大電流放電會導致電芯容量劇減並導致過熱。

2.2 Discharging temperature/放電溫度

The cell shall be discharged within -10℃~45℃ range specified in the Product Specification.

電芯應當在產品規格書中規定的溫度範圍內放電.

2.3 Over-discharge/過放電

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 3.7V and 3.9V.

需要注意的是，在電芯長期未使用期間，它可能會用其自放電特性而處於某種過放電狀態。

為防止過放電的 發生，電芯應定期充電，將其電壓維持在 3.7V-3.9V 之間。

Over-discharge may causes loss of cell performance, characteristics, or cell functions. The charger shall be equipped with a device to prevent further discharging exceeding a cut-off voyage specified in the Product Specification. Also the charger shall be equipped with a device to control the recharging procedures as follows:

The cell pack shall start with a low current(0.01C) for 15-30 minutes, i.e. pre-charging, before rapid charging starts. The rapid charging shall be started after the individual cell voltage has been reached above 3V within 15-30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the individual cell voltage does not rise to 3v within the pre-charging time, then the charger shall have functions to stop further charging and display the cell/pack is at abnormal state.

過放電會導致電芯性能、電池功能的喪失。

充電器應該有裝置老防止電芯放電至低於本標準書規定的截止電壓。此外，充電器還應有裝置以防止重複充電，步驟如下：

電芯在快速充電之前，應先以一小電流（0.01C）預充電 15-30 分鐘，以使（每個）電芯的電壓達到 3V 以上，再進行快速充電。 可用一計時器來實現該充電步驟。如果在預充電規定時間內，（個別）電芯的電壓仍未升到 3V 以上，充電器應能夠停止下一步快 速充電，並顯示該電芯/電池處於非正常狀態。

3. Storage/貯存

The cell should be stored within the proper voltage and temperature range specified in the Product Specification.
電芯應當按照產品規格書中指定的電壓和溫度範圍內存放。

4. Handling of Cells/電芯操作注意事項

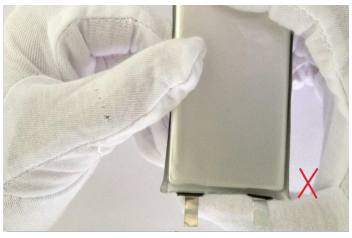
Since the cell is packed in soft package, to ensure its better performance, it’s very important to carefully handle the cell.
由於電芯屬於軟包裝，為保證電芯的性能不受損害，必須小心對電芯進行操作。

4.1 Soft Aluminum foil/鋁箔包裝材料

●The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles.
●鋁箔包裝材料易被尖銳部件損傷，諸如鎳片，尖針。
●Don’t strike battery with any sharp edge parts; 禁止用尖銳部件碰撞電池；
●Trim your nail or wear glove before taking battery;取放電芯時，請修短指甲或戴上手套；
●Clean worktable to make sure no any sharp particle.應清潔工作環境，避免有尖銳物體存在。

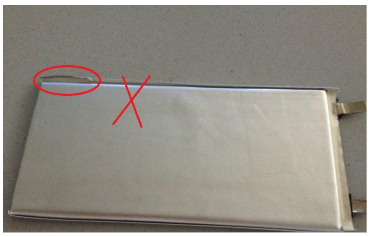
4.2 Sealed edge/頂封邊

●Sealing edge is very flimsy;頂封邊非常容易受到損害；
●Don’t bend or fold sealing edge.禁止彎折頂封邊。



4.3 Folding edge/折邊

●The folding edge is form in battery process and passed all hermetic test. 折邊在電池生產過程中已完成，並通過了密封測試。
●Don’t open or deform folding edge.禁止打開或破壞折邊。



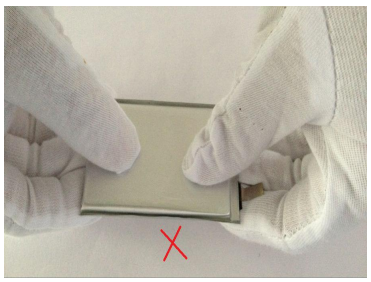
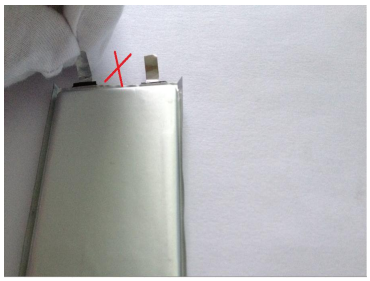
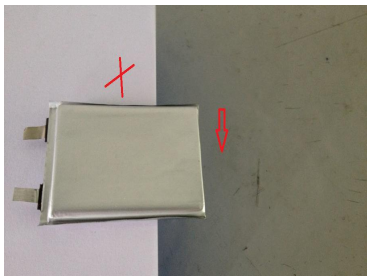
4.4 Tabs/極耳

●The battery tabs are not so stubborn especially for aluminum tab.極耳的機械強度並非異常堅固，特別是鋁片。

●Don’t bend tab. 禁止彎折極耳。

4.5 Mechanical shock/機械撞擊

●Don’t Fall, hit, bend battery body.禁止墜落、衝擊、彎折電芯。

4.6 Short/短路

●Short terminals of battery is strictly prohibited, it may damage battery.

●任何時候禁止短路電芯，它會導致電芯嚴重損壞。

5. Notice Designing Battery Pack/電池外殼設計注意事項

5.1 Pack design/外殼設計

●Battery pack should have sufficient strength and battery should be protected from mechanical shock.

●電池外殼應有足夠的機械強度以保證其內部電芯免受機械撞擊。

●No Sharp edge components should be inside the pack containing the battery.

●外殼內安裝電芯的部位不應有鋒利的邊角。

5.2 PCM design/保護電路模組設計

●The overcharge threshold voltage should not be exceed 4.30V;

●過充的限制電壓應小於 4.30;

●The over-discharge threshold voltage should not be lower than 2.30V;

●過放的限制電壓應大於 2.30V;

●The PCM should have short protection function built inside.

●保護電路模組應具有短路保護功能。

6. Notice for Assembling Battery Pack/電芯與外殼組裝注意事項

6.1 Tab connection/電芯的連接

Ultrasonic welding or spot welding is recommended to connect battery with PCM or other parts. If apply manual solder method to connect tab with PCM, below notice is very important to ensure battery performance.

建議使用超聲波焊接或點焊技術來連接電芯與保護電路模組或其它部分，如使用手工錫焊，須注意以下事項，以保證電芯的功能：

a) The solder iron should be temperature controlled and ESD safe;烙鐵的溫度可控能防靜電；

b) Soldering temperature should not exceed 350℃;烙鐵溫度不能超過 350℃；

c) Soldering time should not be longer than 3s;焊錫時間不能超過 3 秒；

d) Soldering time should not exceed 5 times Keep battery tab cold down before next time soldering;

焊錫次數不能超過 5 次；

e) Directly heat cell body is strictly prohibited, Battery may be damaged by heat above approx.100℃.

必須在鎳片冷卻後才能進行第二次焊接；禁止直接加熱電芯，高於 100℃對電芯會有損壞。

6.2 Cell fixing 電芯的安裝

●The battery should be fixed to the battery pack by its large surface area;應將電芯的寬面安裝在外殼內；

●No cell movement in the battery pack should be allowed.電芯不得在殼內活動。

7. Others/其它事項

7.1 Prevention of short circuit within a battery pack.嚴禁電池組合短路.

●Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection. The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

●在配線與電芯之間要有足夠的絕緣層來提供額外的安全保護。電池在組合時結構必須沒有短路，否則會導致冒煙或起火.

7.2 Prohibition of disassembly/嚴禁拆卸電芯

●Never disassemble the cells/在任何情況下不得拆卸電芯

●The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, or other problems.

●拆卸電芯可能會導致內部短路，進而引起鼓氣、著火及其它問題。

Electrolyte is harmful/電解液有害

●LIP battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact

with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

●聚合物鋰電池理論上不存在流動的電解液，但萬一有電解液洩漏而接觸到皮膚、眼睛或身體其它部位，應立即用清水沖洗電解液並就醫。

7.3 Prohibition of dumping of cells into fire/嚴禁將電芯投入火中

Never incinerate nor dispose the cells in fire. These may cause firing of the cells, which is very dangerous and is prohibited.

在任何情況下，不得燃燒電芯或將電芯投入火中，否則會引起電芯燃燒，這是非常危險的，應絕對禁止。

7.4 Prohibition of cells immersion into liquid such as water/嚴禁將電芯浸入液體，如水

The cells shall never be soaked with liquids such as water, seawater drinks such as soft drinks, juices coffee or others.

不得將電芯浸泡液體，如淡水、海水、飲料（果汁、咖啡等）。

7.5 Battery cells replacement/電芯的更換

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

更換電芯應由電芯供應商或設備供應商完成，使用者不得自行更換。

7.6 Prohibition of use of damaged cells/禁止使用已損壞的電芯

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of electrolyte, electrolyte leakage and others, the cells shall never be used any more. The cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing.

電芯在運輸過程中可能因撞擊等原因而損壞，若發現電芯有任何異常特徵，如電芯塑膠封邊損壞，外殼破損，聞到電解液氣體，電解液洩漏等，該電芯不得使用。有電解液洩漏或散發電解液氣味的電池應遠離火源以避免著火。