Specification Approval Sheet

Name : **Polymer Lithium-Ion Battery**

Model : **7872196**

Spec : **3.7V/10000mAh**

Number: **060602490765**

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Specification Approval Sheet

AA Portable Power Corp.

Specification Modification Records

Modification Time	Descriptions	Issued Date	Approved By
0	New release	2006-06-09	

Content

Handling Precautions and Guideline

1.Scope:

This Document describes the Product Specification of chargeable Polymer Lithium Battery produced by AA Portable Power Corp.

2.Model:7872196

3.Cell parameter Index:

3.1 Single cell parameters

No.	Item	Spec.	Note
1	**Model**	7872196	
2	**Charge Voltage**	4.20V	
3	**Nominal Voltage**	3.7V	Cell Voltage between 3.6V ~3.9V before shipping
4	**Nominal Capacity**	10000mAh @0.2C discharge Min:9900mAh	Nominal Capacity refers to the capacity of 0.2C discharge with 2.75V cut-off voltage, after charging by standard method.
5	**Life Cycle**	≥ 300 Times	One cycle refers to one charge period and discharge period. Test conditions: Charge: 2000 mA to 4.2V Discharge: 2000 mA to 2.75V The life cycle is the cycle times until charged capacity is about 80% of the rated capacity.
6	**Self -discharge**	Residual Capacity>90%	After standard charging, storied at 25°C±0.5°C for 30 days, then measure the capacity as Item 4.
7	**Impedance**	Typical: 20mΩ Max:25mΩ	After Standard charging, measure the internal resistance with AC1KHz
8	**Max. Charge Current**	1.0CmA (10000mA)	
9	**Max. Discharge Current**	1.0CmA (10000mA)	
10	**Discharge Cut-off Voltage**	2.75V	

11	**Operating Temperature**	Discharge: -10℃ ~ +60℃ Charge: -10 ℃~ +45℃	Cells must be storied at 3.6V-3.9V. During long period storage, cells should be maintained every 90 days. The method is to do a charge-discharge cycle with standard method, then charge to 3.7V.
12	**Storage Temperature**	-10 ℃~+45℃	
13	**Cell Weight**	Approx 228g	
14	**Cell Dimension**	Length：197.5mm Max Width：72.5mm Max Thickne：8.0mm Max	Not include Tabs

4.Electronic Characteristics test and inspection:

4.1 Visual inspection

Any visual defects, affect the electrical characteristics, such as cracks, leakage, and flaw, do not exist.

4.2 Standard testing environment

Unless otherwise specified, all tests stated in the Product Specification are conducted at below conditions:

Temperature： 25℃ ± 0.5℃

Humidity： 65 ± 20%

4.3 Charge/Discharge Methods and Test Conditions

No.	Item	Testing Condition and Method
1	**Charging Current**	Standard CC：0.2C (2000mA) Quick CC：0.5C (5000mA)
2	**Standard Charging**	Constant Current Charging at 0.2C(2000mA) to 4.2V. Constant Voltage Charging at 4.2V to cut-off current≤0.05CmA(500mA)
3	**Quick Charging**	Constant Current Charging at 0.5C(5000mA) to 4.2V. Constant Voltage Charging at 4.2V to cut-off current≤0.05CmA(500mA)
4	**Standard Discharge**	Constant discharge at 0.2CmA (2000mA) to cut-off voltage of 2.75V.
5	**Charging Time**	Standard charging time ：6.0hr Quick charging time：2.8hr
6	**Temperature & Humidity**	Standard charging：0℃~ 45 ℃ 45~85% RH Quick charging：10 ℃~ 45 ℃ 45~85%RH Standard discharging：-10 ℃~ 60 ℃ 45~85% RH
7	**Open Voltage**	3.6~3.9V (Before shipping)

Notes：

a. The Max. voltage while charging is not more than 4.30V.
b. The Max. protective voltage designed on PCB board should not more than 4.30V.

4.4 Mechanical Characteristics

No.	Item	Testing Conditions and Method	Standard
1	**Vibration Test**	After standard charging, fix the cell on vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minutes between 10Hz and 55Hz, the excursion of the vibration is 0.38mm. The cell shall be vibrated for 90 minutes fro three axis of XYZ axes.	No leakage. Left Capacity≥90%, after 3 hours.
2	**Drop Test**	Drop the cell from 1meter height onto the concrete ground twice.	No explore, no fire and no leakage

4.5 Safety performance

Item	Condition	Criteria
Overcharge Test	After standard charge(Section 4.3),the battery shall be charged at 1C(10000mA)/4.70V for 2.5hrs.	No rupture, No fire, No smoke.
Short Circuiting Test	After standard charge(Section 4.3),the battery shall be subjected to a short-circuit condition with a wire of resistance less than 100mΩ for 1 hour.	No rupture, No fire, No smoke.
Over Discharge Test	After discharged to the cut-off voltage, the battery shall be subjected to a short-circuit condition with a load of resistance less than 30Ω for 28 hour.	No rupture, No fire, No smoke.
High Temperature Test	Leaving the battery at 55±2℃ for 4 hours after standard charge.	No explosion, no fire. Recovery Capacity ≥80%C5
Heat Test	A battery is to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of 5±2℃/min to a temperature of 120±2℃ at which temperature the oven is to remain for 10 minutes before the test is discontinued.	No explosion, no fire.

5.Storage and others

5.1 Long Period Storage

If the cell has been stored for 3 month, it should be transfer to a dry and cool environment. Storage Voltage is between 3.6V and 3.9V and the storage conditions as Item 4.2.

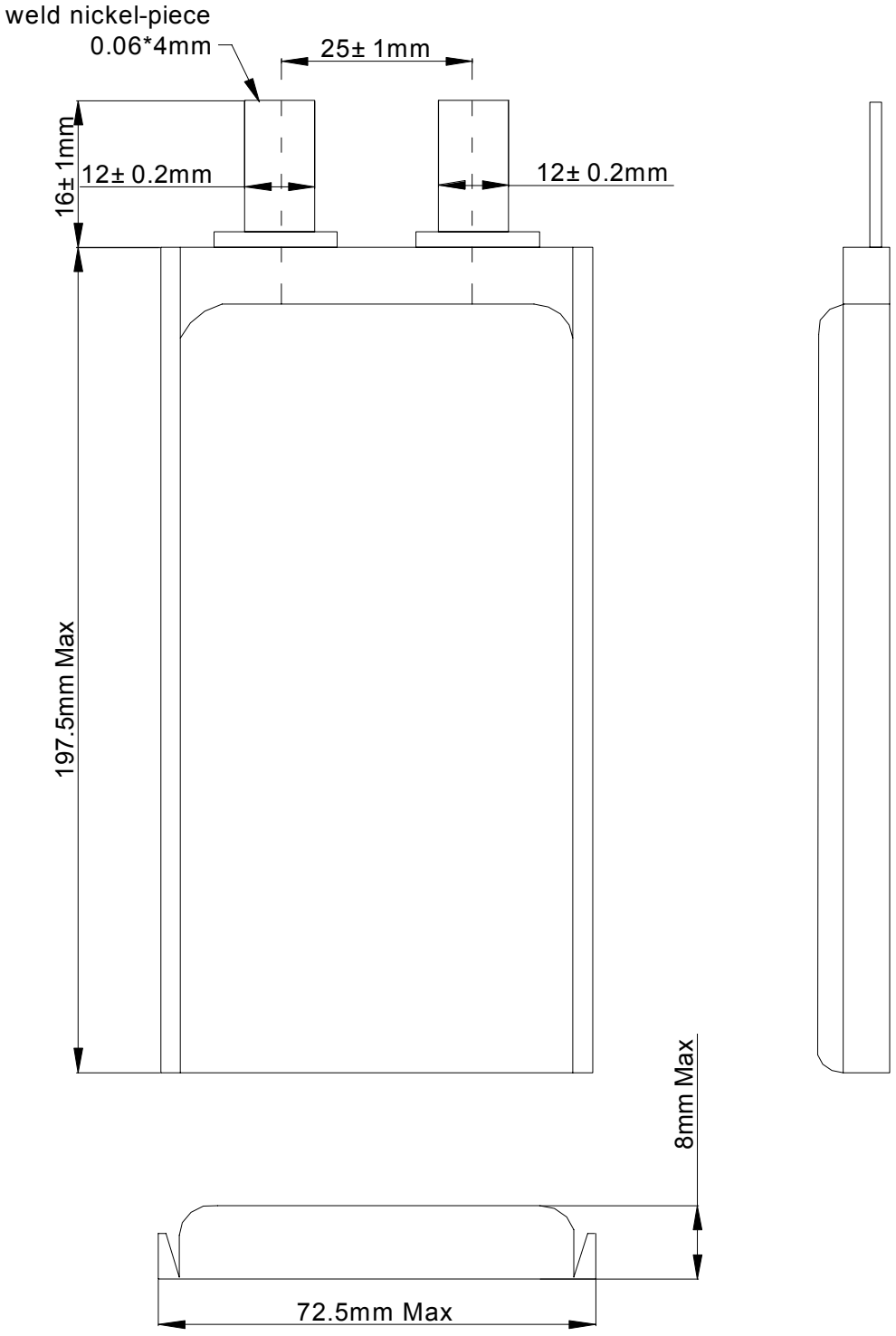
5.2

Any matters that this specification does not cover should be conferred between customers and **AA Portable Power Corp**.

6.Drawing

6.1 Assembly diagram（not in scale）

Model：7872196



Handling Precaution and Guideline

For Polymer Lithium Rechargeable Batteries

Preface

This document of 'Handling Precautions and Guideline LIP Rechargeable Batteries' shall be applied to the battery cells manufactured by AA Portable Power Corp.

Note (1): The customer is requested to contact AAPPC in advance, if and when the customer needs different applications of operating conditions from those described in this document. Additional experimentation may be required to verify performance and safety under such condition.

Note (2): AAPPC will take no responsibility for any accident when the cell is used under other conditions.

Note (3): AAPPC will inform, in a written form, the customer of improvement(s) regarding proper use and handling of the cell, if it is deemed necessary.

1. Charging

1.1 Charging Current:

Charging current should be less than maximum charge current specified in the Specification Approval Sheet.

1.2 Charging Voltage:

Charging voltage should be less than the maximum nominal voltage 4.2V, and the charging voltage upper limited is 4.30V.

1.3 Charging Temperature:

The cell should be charged within the range specified in this Specification Approval Sheet.

1.4 Notes:

Since charging with constant current or constant voltage, reverse charging is prohibited. 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.

2. Discharging Current:

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

3. Discharging Temperature

Discharging Temperature should be within the range specified in this Specification Approval Sheet.

4.Over-Discharge

Over-charging will cause cell low-performance and function loss. The cell would be in a over-discharged state by its self-discharge characteristic. In order to prevent over-discharging, the cell shall be charged periodically to maintain between 3.6V and 3.9V.

5. Protective Circuit Module

5.1 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.

5.2 Overcharging Protection

Overcharging prevention function shall stop charging if any cell of the battery pack reaches 4.3V.

6. Storage

Cells should be stored in proper temperature specified in Specification Approval Sheet.

7. Notice⚠

7.1 Handling of cells:

★ Avoid any short-circuit, for it will caused the pole hot and lost electronic functions.

★ Soft packing is very damaged by sharp edge parts such as needles and knives. Avoid cells touch with sharp edge part, when handling and Storage.

★ Beside the poles is the sealed edge. Don’t bend or fold dealing edge, for it is a sensitive part.

★ Don’t open the folding edge on both sides of the cells.

★ Don’t bend the tabs, for the tabs are not so stubborn.

★ Avoid mechanical shock to the cells.

★ Don’t put the cells into the heater, washing machine or high-voltage container.

★ Don’t use the charger without any safety guarantee, and recommend you use specified charger.

★ You should immediately stop charging, as cell is overheating, delivery any smell, changed color, distortion etc.

★ Put cells in the place where children cannot reach.

★ Before Children use batteries, adults should explain the usage first.

★ Before use batteries, please read the handling guideline carefully and fully understand.

★ Away from the static-electronic field, while using, charging and storing cells.
★ Avoid using, charging or storing cells near the fire or in the cars with higher than 60℃ ambient temperature.
★ Don't put the cells together with metal conductors such as chains, barrette, bolt into the pocket or stored them together.
★ Don't use metal conductor to shortcut the positive and negative poles.
★ Don't mis-assemble the positive pole with the negative one.
★ Don't use the damaged cells.

7.2 Notice for Designing Battery Pack

7.2.1 Package Design

① Battery pack should have sufficient strength and battery should be protected from mechanical shock.
② No sharp edge components should be inside the pack containing the battery.

7.3 Notice for Assembling Battery Pack

7.3.1 Tab connection

① Ultrasonic welding or spot welding is recommended to connect battery with PCM or other parts.
② If apply manual solder method to connect tab with PCM, below notice is very important to ensure battery performance.
a. The solder iron should be temperature controlled and ESD safe.
b. Soldering temperature should not exceed 350℃.
c. Soldering time should not be longer than 3s.
d. Keep battery tab cold down before next time soldering.
e. Directly heat cell body is strictly prohibited. Battery should be damaged by heat above approx. 60℃.

7.3.2 Cell fixing

① The battery should be fixed to the battery pack by its large surface area.
② No sharp edge at the assembling position.
③ No cell movement in the battery pack should be allowed.

8.Others

8.1 The disassembling may generate internal shout circuit in the cell, which may cause gassing, firing, or other problem.

8.2 LIP battery should not have liquid flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians, we recommend as below:
a. The electrolyte touch eyes: Flush the electrolyte immediately with fresh water for 15min. and medical advice is to be sought.
b. The electrolyte touch skin: Flush the electrolyte immediately with a great deal of fresh water.
c. Breath the released gas: Go outside to breath flash air.
d. Mis-eaten: Go to take some medical advice.

8.3 Prohibition of dumping of cells into fire
Never incinerate or dispose the cells in fire, for these may cause firing of the cells.

8.4 The cells should never be soaked with liquids such as water, drinks or oil.

8.5 Prohibit using the cells mixed with different manufactories. Prohibit using new cells mixed with old ones.

8.6 Prohibit using damaged cells.

9. Recommended Notice:

9.1 Using cells on specified facilities only.

9.2 Using cells in normal ambition temperature. Temperature: -10～40℃, Relative Humidity：65±20%

9.3 Using the cells, away from heat source. Don't let children play with cells. Don't drop cells. Charging cells with specified charger.

9.4 Avoid the positive pole shortcutting with the negative one. Avoid the cells affected with damp.

9.5 Useless cells should be deal with in a safety way. Don't drop them into the water or fire.

▲Special notice: Keep the cells in half-charged state, which is keeping them fully charged or completely discharged. Storing the cells in cool and dry place.