Specification of Li-Fe Battery

Revision1

Type: IFR32600P300

2007-11-10

1. Preface

This Product Specification describes the requirements for the lithium ion rechargeable battery cell ("Cell") to be supplied by AA Portable Power Corp.

2. Description and Model

2.1 Description	Lithium ion rechargeable battery cell
2.2 Model	IFR32600P300

Note: IFR*32*600*P*300 = LiFePO4--Li-ion Cylindrical *Diameter* Height*Kind* Capacity

3. Ratings

3.1 Rated Capacity	2600mAh (Norminal)	
3.2 Nominal Voltage	3.2V	
3.3 Internal Impedance	≤10mΩ	
3.4 Charging method	Constant Voltage with limited Current	
3.5 Initial Charge Current	Standard Charge	: 1350mA
	Rapid Charge	: 2600mA
3.6 Charging Time	Standard Charge	: Approx. 4 hours
	Rapid Charge	: Approx. 2 hours
3.7 Max. Charge Current	2600mA	
3.8 Discharge Method-Standard	30A	
3.9 Max. Continiuous Discharge	60A	
3.10 Pulse discharge at 30 sec	75A	
3.11 Discharge Cut-off Voltage	2.0V	
3.12 Cell Dimension	Height	Max.60.6mm
	Diameter	Max.32.6mm
3.13 Operating Temperature	Charge	0℃ ~ 45℃
	Discharge	-10℃ ~ 50℃
3.14 Storage Temperature	1 month	-20℃ ~ 45℃
	3 month	-20℃ ~ 45℃
	1 year	-20℃ ~ 20℃
3.15 weight	108 g	

4. Outline Dimensions

See attached drawing (Fig.1).

5. Appearances

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

6. Standard Environmental Test Conditions

Unless otherwise specified, all tests stated in this Product Specification are conducted at temperature 20 +/- 5deg.C and humidity 65 +/- 20 %RH, as specified in JIS Z 8703 Standard (Standard Test Conditions). If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15 ~ 30℃ and humidity 25 ~85%RH.

7. Characteristics

<table>
<tr><td>Items</td><td>Test Condition</td><td>Criteria</td></tr>
<tr><td>7.1 Standard Charge</td><td>The "Standard Charge" means charging the Cell with initial charge current 1500 mA and with constant voltage 3.65 V ,then constant voltage(3.65V)with floating current taper to 60mA cut-off (Charger for exclusive use lithium ion rechargeable battery, with an accuracy 3.65+/-0.1V) at 20℃ for 5 hours.</td><td></td></tr>
<tr><td>7.2 Initial Capacity</td><td>The capacity means the discharge capacity of the Cell, which is measured with discharge current 30000mA with 2.00 V cut-off at 20deg.C within 6 min after the Standard Charge.</td><td>Initial Capacity >=2950mAh</td></tr>
<tr><td>7.3 Cycle Life</td><td>Each cycle is an interval between the charge (charge current 3000mA) CC 3000mA to 3.65V, CV to 60mA , stop 30min and discharge (discharge current 30000mA) with 2.00 V cut off, stop 60min at 20℃.Capacity after 300 cycles and plus 1 day, measured under the same conditions stated in 7.2.</td><td>Capacity >= 70%</td></tr>
<tr><td>7.4 Initial Internal Impedance</td><td>Internal resistance measured at 1KHz after Standard Charge.</td><td>Initial Internal Impedance <=10milli-ohm</td></tr>
<tr><td>7.5 Discharge Capacity Rate</td><td colspan="2"><table>
<tr><td>Charge Current</td><td colspan="4">Discharge Rate</td></tr>
<tr><td rowspan="2">0.5 C_5A</td><td>1C_5A</td><td>10C_5A</td><td>15C_5A</td><td>20 C_5A</td></tr>
<tr><td>100%</td><td>95~100%</td><td>95~100%</td><td>90~95%</td></tr>
</table></td></tr>
<tr><td>7.6 Storage Characteristics</td><td>Capacity after 30 days storage at 20℃ from Standard Charge, measured under the same conditions stated in 7.2.</td><td>Remaining Capacity(after 20℃storage) >= 90%</td></tr>
<tr><td>7.7 Cell Voltage</td><td>As of shipment</td><td>Cell Voltage range

3.2~ 3.40V</td></tr>
<tr><td>7.8 Drop Test</td><td>Cell (as of shipment) to be dropped onto the oak-board (thickness >= 20 mm) from 1.2 m height at a random direction, 3 times total at 20+/-5℃.</td><td>No leakage
Capacity Recovery rate >= 90% (*1)</td></tr>
<tr><td>Items</td><td>Test Condition</td><td>Criteria</td></tr>
<tr><td>7.9 External Short-circuiting Test</td><td>To short-circuit the Cell charged 3.65 V by connecting positive and negative terminal by 30milli-ohm wire for 1 hour.</td><td>No rupture, and no fire</td></tr>
<tr><td>7.10 Overcharge test</td><td>Cells are charge at constant current of 3CmA and constant voltage of 10V for 2 hour.</td><td>No rupture, and no fire</td></tr>
<tr><td>7.11Over discharge test</td><td>after standard charge .Cells are discharged at constant Current of 0.2CmA to 2.0V,and the positive and negative terminal is connected by a 30Ω wire for 24 hour.</td><td>No rupture, and no fire</td></tr>
<tr><td>7.12 Nail test</td><td>A Steel needle (diameter: 2.5mm-5mm) is Penetrated vertically through the center of a fully charged cell</td><td>No rupture, and no fire</td></tr>
<tr><td>7.13 Heating test</td><td>After standard charge ,Cells are heated in a circulating air Oven at a rate of 5℃ per minute to 150℃ and keeping the state for 30 minutes</td><td>No rupture, and no fire</td></tr>
</table>

Note (*1)

Recovery rate is measured by the condition of 7.2 after leaving cells at 20℃ for 3 hours.

8. Product Liability

The Safety should be sure to confer previously with between the both parties.
The results of the conference must be recorded and the range of the liability or the burden should be cleared.
The indications of a warning are established by conference with between the both parties.

9. Packaging method

The standard packaging method for IFR32600P300 shall apply.
See attached drawing (Fig.2) (Fig.3).
The insulators in the carton are put between the batteries to prevent the batteries from short circuit.
The carton size is the same as before, but the quantity in the carton will be reduced accordingly than before.
PS: The packaging Method for both Cylindrical Lithium ion Rechargeable Batteries/Cells and Advanced Lithium ion Rechargeable Batteries/Cells will be not changed.

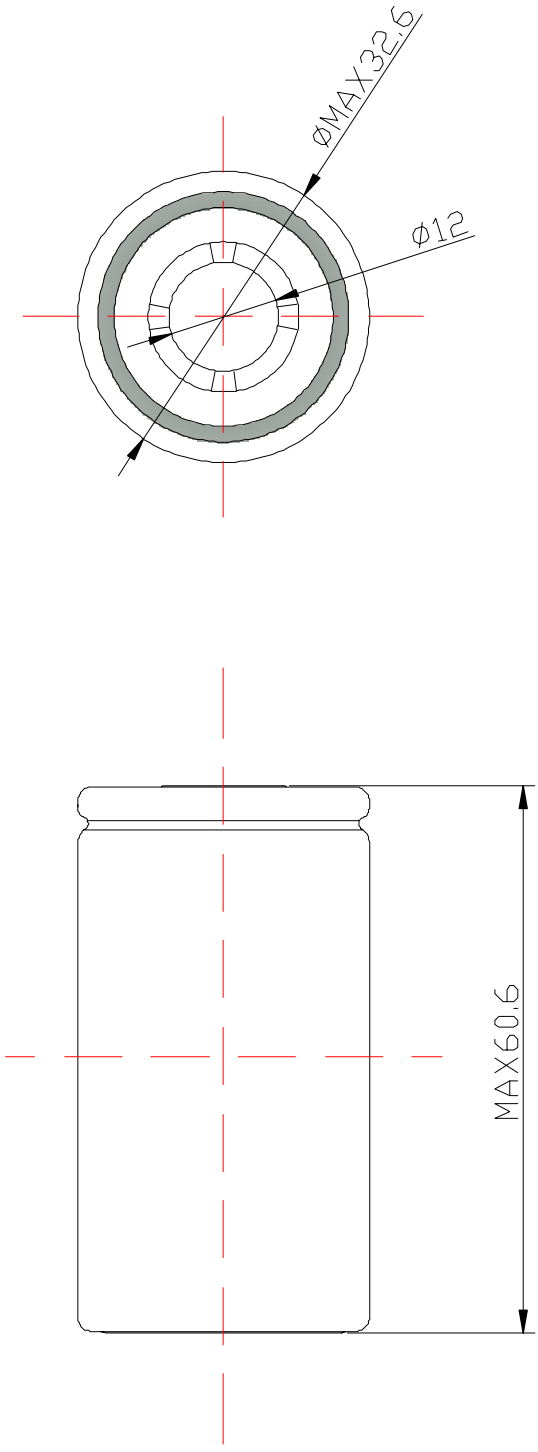
10. Warranty

As long as the Cell is treated in accordance with this Product Specification and / or Handling Precautions and Prohibitions, Supplier warrants that the Cell should be free from any defect for a period of 3 months (20℃ or less) from the date of shipment or for 500 cycles (see 7.3), whichever comes earlier.
The warranty set forth above or described in Handling Precautions and Prohibitions for Lithium Ion Rechargeable Batteries excludes a defect, which is not related to manufacturing of the Cell.

11. Others

10.1 Storage for a long time If Cell is preserved for a long time (3 or 4 months), the Cell is preserved at the dry and low temperature.
10.2 Other Any matters that this specification does not cover should be conferred between the both parties.

Fig.1 Dimensional Drawing of IFR32600P300
(Unit: mm)



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