

Lithium-ion Rechargeable Battery

Product Specification

Product Name : LiFePO4 Li-ion Battery

Model No. : F10-1565150

Specification No. : F3.2V/10Ah

Version No. : A1

Issue Date : 2017-07-25

Prepared By	Checked by	Approved by
Xiaofang Zhou	Chunhai Lu	ZEN

1、Scope

This specification describes the performance, testing method, warning and caution of the LiFePO4 Li-ion battery cells supplied by Hangzhou LIAO Technology Co., LTD.

2、 Configuration & Dimension

Item	data (mm)	Image
A	139	
B	11	
C	M6	
D	7.5	
E	15	
F	65	
G	14	
H	36	
I	7.5	

3、 Parameters

Item	data	Remark
Configuration	Prismatic Aluminum- Case Cell	
Size	150*65*15mm	L*W*H , including bolts , not including PVC film , Tolerance±0.5mm.
Nominal capacity	10Ah	25±5 °C , 0.2C(2A) , CC(constant current)discharged to 2V.
Nominal voltage	3.2V	
Charge cut-off voltage	3.65V	
Discharge cut-off voltage	2V	
Standard charge current	2A	0.2C(2A) CC (constant current) charged to 3.65V, then CV (constant Voltage) 3.65V charge till current decline to 200mA.
Max. charge current	10A	1C(10A) CC(constant current)charged to 3.65V, then CV(constant Voltage)3.65V

		charge till current decline to 200mA.
Standard discharge current	2A	0.2(2A)C , CC (constant current) discharged to 2V.
Max continuous discharge current	30A	3C(30A) , CC (constant current) discharged to 2V.
Max peak discharge current	50A	Lasting time ≤ 1 min.
Retention ability of Charge capacity	$\geq 95\%$ Nominal capacity	Standard charge at 0.2C CC/CV to 3.65V, cut off current $\leq 0.02C$ at $25 \pm 5^\circ C$. Discharge at 0.5C CC to 2V after store it at $25 \pm 5^\circ C$ for 28 days record the battery discharge capacity.
Cycle Life	≥ 2000 times	Standard charge at 0.2C CC/CV to 3.65V, cut off when current $\leq 0.02C$ at $25 \pm 5^\circ C$. Standard discharge at 0.5C CC to 2V at $25 \pm 5^\circ C$. Repeat the cycle of standard charge and discharge, When the battery capacity is less than 80% of the nominal capacity, stop the test.
-20°C Discharge performance	$\geq 55\%$ Nominal capacity	Fully charge the battery at room temperature. Standing at -20°C for 20hrs, discharge at 0.5C to 2.0V.
60°C Discharge performance	$\geq 98\%$ Nominal capacity	Fully charge the battery at room temperature. Standing at 60°C for 6hrs, discharge at 0.5C to 2.0V.
Impedance	$\leq 6m\Omega$	Between discharge port of Cathode and Anode.
Weight	$275 \pm 10g$	
Charging Temp.	$0 \sim 45^\circ C$	Suggested Temp.
Discharging Temp.	$-20 \sim 60^\circ C$	Suggested Temp.
Storage Temp.	$-20 \sim 45^\circ C$	Suggested storage Temp. if long-term no use the battery.

4、Safety Performance & Testing method

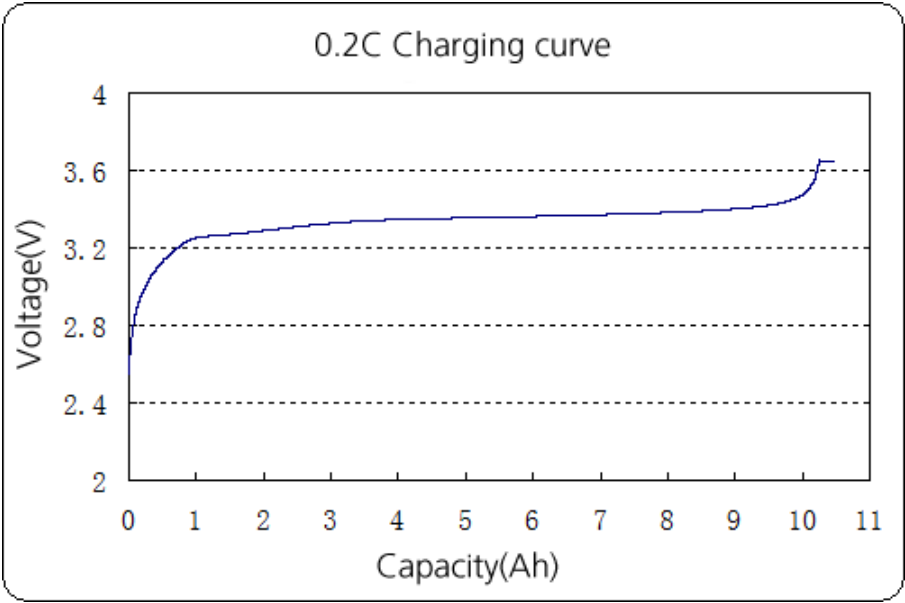
No.	Item	Standard	Testing method
1	Vibration test	No fire, no explosion, no leakage.	After standard charged, fix the cell to vibration table, then subjected to vibration test for 30 minutes per axis of XYZ axes. Frequency rate: 1oct/min Vibration frequency: 10Hz-30Hz Excursion (single amplitude): 0.38mm Vibration frequency: 30Hz-55Hz Excursion (single amplitude): 0.19mm
2	Drop test	No fire, no explosion, no leakage.	Drop the battery in the shipment condition from 1m height onto 5cm or thicker concrete with p-tile on it 3 times each of X, Y and Z directions.
3	Over-charge test	No fire, no explosion	Charge in accordance with the following two ways (Choosing one between the two). (1) Charge at 1C current for 90min or until the voltage of the battery reaches 5.0V (stop test when fulfills either condition). (2) Charge at 3C current until the voltage of the battery reaches 10.0V, then stop the test.
4	Over- discharge test	No fire, no explosion	Charge the battery. Place at $20 \pm 5^\circ C$ for 1h, then discharge in 1/3C current at the same temperature until the cell's voltage is 0V.

5	Heating test	No fire, no explosion	After standard charged, the 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)°C/min to a temperature of 150°C±2°C, keep that temperature for 30 minutes before the test is discontinued.
6	Short circuit test	No fire, no explosion	After standard charged, the battery shall be subjected to a short-circuit condition with a wire of resistance less than 3mΩ for 1 hour. Short circuit positive and negative pole ,monitor battery temperature during the test ,when the temperature of the battery is below its peak value of 10 degrees centigrade ,end test.Temperature less than 115°C.
7	Prick test	No fire, no explosion	After standard charged, hitting from the direction perpendicular to the series batteries with a nail of 3~8mm diameter and more than 90 mm in length, nail pierces through at least three parallel batteries with speed of 20mm-40mm/S. Keep the nail in the batteries for at least 1h.
8	Impact test	No fire, no explosion	After standard charged, the battery is to be placed on a flat surface, place a Φ 15.8mm steel column in the center of the battery,the longitudinal axis of a steel column is parallel to the plane.10Kg weight is to be dropped from a height of 610mm onto the battery.
9	Squeeze test	No fire, no explosion	After standard charged, Put the battery between two squeeze plates of the extrusion equipment, then increase pressure to 13kN, hold on for 1 min. The squeeze direction is on the direction perpendicular to arranged battery.

5、Curves

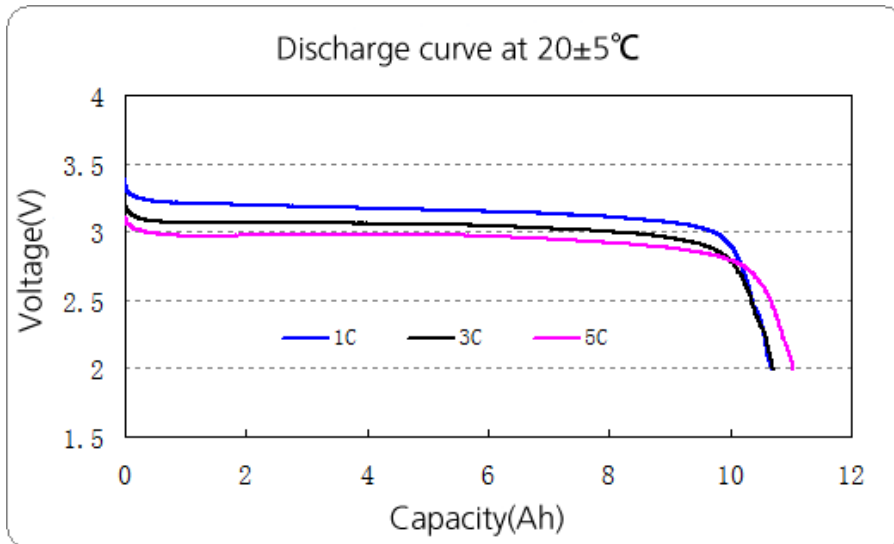
5.1 Charge curves at room temperature

Charge at 0.2C at room temperature,Cut-off current of charge is 0.2A, Cut-off voltage of charge is 3.65V.



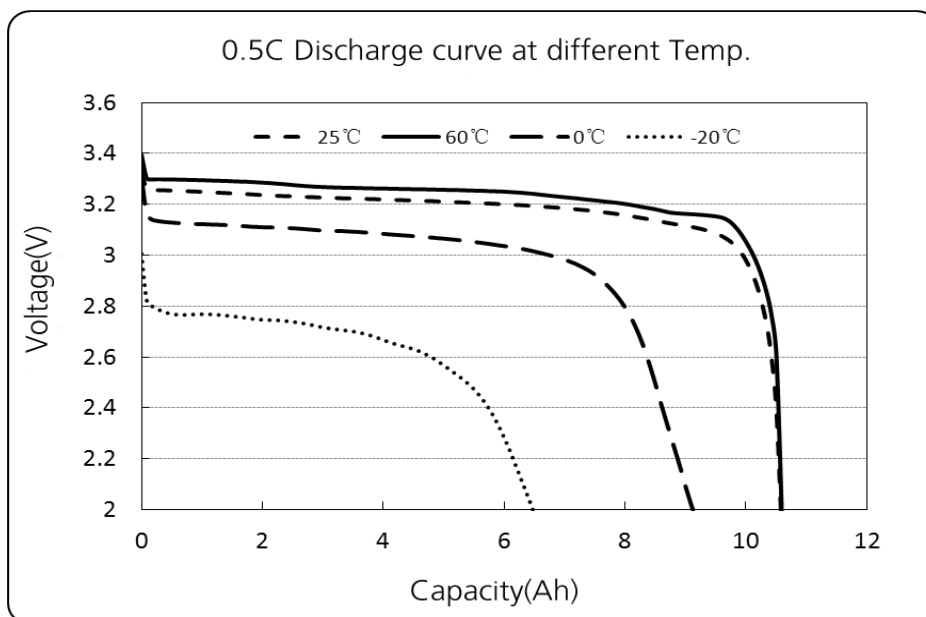
5.2 Discharging curves at different current

Discharge at different current of 1C,3C and 5C to cut-off voltage of 2V.



5.3 Discharging curves at different temperature

Fully charged the battery at room temperature, discharge it at different temperature with 0.5C current to 2V



6、Storage & Transportation

6.1 Storage

When the battery need to be long-term stored, charge the battery to about 10%-20% capacity, store it in dry and ventilated place, Charge and discharge battery one time every 6 months.

6.2 Transportation

The battery should keep 10% capacity during transportation, prevent excessive vibration, shock or extrusion in transport process and prevent the sun and rain. The battery can be transported by cars, trains, ships, aircraft and other vehicles etc.