



This specification shall be applied to Lithium Titanate rechargeable battery cell supplied by AA Portable Power Corp.

1. Product Specification

Type	Lithium Titanate Cathode material: LiMn_2O_4 Anode material: $\text{Li}_4\text{Ti}_5\text{O}_{12}$
Model	LTO-M55345D
Voltage	Nominal: 2.4V
Capacity	Minimum: 45Ah @0.5C Discharge
CV Charging Voltage	Maximum: 3.0 V
Charge current	Standard charge: 0.5C 0.5C CC(constant current) charge to 3V, then CV(constant voltage 3V) charge till charge current declined to $\leq 0.05\text{C}$ Rapid Charge: 3C
Charging Time	Standard charge: 2 hours (Ref.) Rapid charge: 1/3 hours (Ref.)
Discharge current	3C
Discharge cut-off voltage	1.5V \pm 0.15V
Operation temperature	Charge: -40~ 45 °C Discharge: -40 ~ 55 °C
Storage temperature	-40~ 45 °C
Weight	2000g
Dimension	Length without Cathode and Anode: 345.0 \pm 1.5mm Diameter: 55.0 \pm 0.5mm



2. Battery Performance Criteria

2.1 Electrical characteristics

No	Item	Test Method and Condition	Criteria
1	Standard Charge	Charging the Battery initially with constant current at 0.5C and then with constant voltage at 3V till charge current declines to 0.05C.	N/A
2	Initial Capacity	The capacity means the discharge capacity of the battery, which is measured in terms of discharge current of 0.5C and 1.5V cut-off voltage after the standard charge.	
3	Cycle Life	Test condition: Charge: 0.5C to 3V Discharge: 0.5C to 1.5V 80% or more of 1 st cycle capacity at 0.5C discharge of Operation	≥ 10000 cycles
4	Self-discharge	After the standard charging, store the battery under the condition as No.2.4 for 30days, then measured the capacity with 0.5C till 1.5V	Remaining capacity > 95%
5	Initial Impedance	Internal resistance measured at AC 1KHz after 50% charge	2mΩ
6	Battery Voltage	As of shipment	2.4±0.1V

2.2 Mechanical characteristics

No	Item	Test Method and Condition	Criteria
1	Vibration Test	After standard charging, fixed the Battery 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 amplitude of the vibration is 1.6mm. The Battery shall be vibrated for 30 minutes towards per axis of XYZ axes.	No leakage No fire
2	Drop Test	The Battery is to be dropped from a height of 1 meter twice onto concrete ground.	No explosion, no fire, no leakage.

2.3 Visual inspection

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

2.4 Standard environmental test condition

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

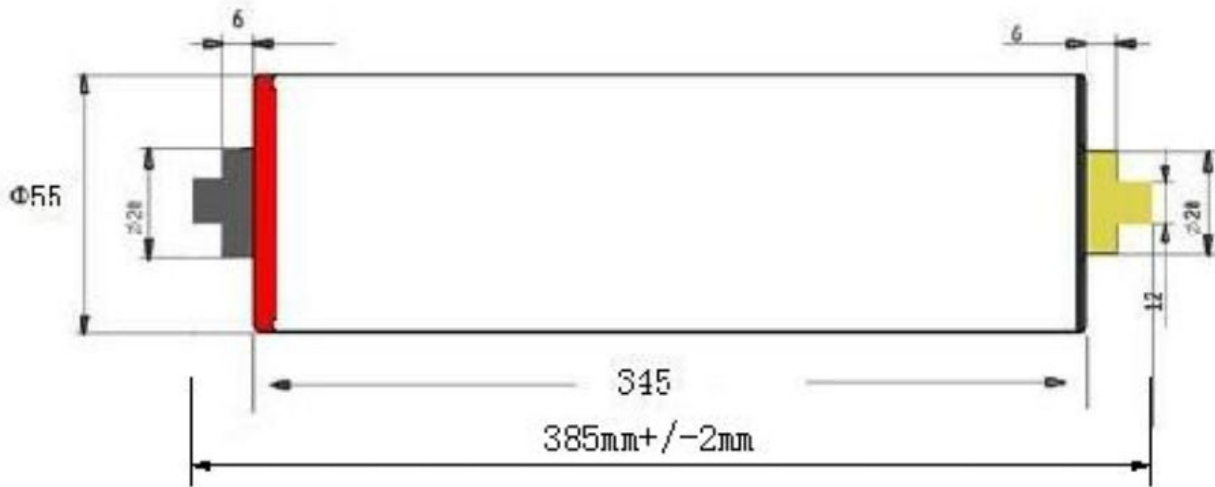
Temperature: 23 ± 5°C

Humidity: 65 ± 20% RH

3. Storage and Others

Long Time Storage: If the Battery is stored for a long time (over 3 months), the battery's storage voltage should be 2.40~2.80V and the battery is to be stored in according to the condition specified about No. 2.4

4. Dimension (mm, not in scale)



Length	345.0±1.5mm
Diameter	55.0±0.5mm

5. Handling and Prohibitions

5.1 Electrical misusage

- Use dedicated charger
- Don't charge the cell/battery reversely.

5.2 Environmental misusage

- Don't leave the cell/battery near the fire or a heated source.
- Don't throw the cell/battery into the fire.
- Don't charge or use the cell/battery in a car or similar place where inside of temperature may be over 60°C.
- Don't immerse, throw or wet the cell/battery in water / seawater.

5.3 Others

- Don't store the cell/battery in a pocket or a bag together with metallic objects such as keys, necklaces, hairpins, coins, or screws.
- Don't short circuit (+) and (-) terminals with metallic object intentionally.



- Don't heat partial area of the battery with heated objects such as soldering iron.
- Don't hit with heavy objects such as a hammer, weight.
- Don't step on the cell/battery and throw or drop the cell/battery on the hard floor to avoid mechanical shock.
- Don't disassemble the cell/battery or modify the cell/battery design including electric circuit.
- Don't use seriously scared or deformed cell/battery.
- Don't put the cell/battery into a microwave oven, dryer or high-pressure container.
- Don't use or assemble with different brands, types and/or models of cell/battery such as dry cell/battery, nickel-metal hydride cell/battery, or nickel-cadmium cell/battery.

[Warning!]

- Don't use or assemble old and new cell/battery together.
- Stop charging the cell/battery if charging isn't completed within the specified time.
- Stop using if the cell/battery becomes abnormally hot, discoloration, deformation, or abnormal conditions are detected during use, charge, or storage.
- Keep away from fire immediately when leakage or foul odors are detected.
- If liquid leaks onto your skin or cloths, wash well with fresh water immediately. If liquid leaking from the cell/battery and getting into your eyes, don't rub your eyes but wash them with clean water and go to see a doctor immediately.
- If the terminals of the cell/battery become dirty, wipe with a dry cloth before use.
- The cell/battery can be used within the certain temperature ranges. Don't exceed these ranges. Check specification first.

[Caution!]

- Battery must be charged with constant current-constant voltage (CC/CV).
- Charge current must be controlled by specified value in cell/battery's specification.
- Discharge current must be controlled by specified value in cell/battery's specification. Cut-off voltage of discharging must be over 1.5V/cell.
- It should be noted that the Battery might be at an over-discharged state because of its self-discharge property when the Battery is not long use. In order to prevent over-discharging, the Battery shall be charged periodically to maintain its voltage between 2.40V and 2.80V. Over-discharging may cause loss of battery performance, characteristics, or battery functions. The charger shall be equipped with a device to prevent the battery from further discharging below the cut-off voltage specified in the product specification. Also the charger shall be equipped with a device to control the recharging procedures as follows: The Battery pack shall start with a small current (0.01C) for 15 - 30 minutes, i.e. pre-charging, before rapid charging starts. The rapid charging shall be started after the individual battery voltage has been reached above 1.5V within 15 - 30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the (individual) Battery voltage does not rise to 1.5V within the pre-charging time, then the charger shall have functions to stop further charging and display the Battery/pack is at an abnormal state.
- Keep the cell/battery away from babies and children to avoid any accidents such as swallow. If children



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use the cell/battery, their guardians should explain the proper handling method and precaution before using.

- Before using the cell/battery, be sure to read the user's manual and precaution of handling.
- Before using charger, be sure to read the user's manual of the charger.
- Before installing and removing the cell/battery from application, be sure to read user's manual of the application.
- Replace the cell/battery when running time becomes much shorter than usual. Cover terminals with insulating tape before proper disposal.
- If the cell/battery is needed to be stored for a long period, battery should be removed from the application and stored in a place where humidity and temperature are low.
- To prevent the deterioration of the performance caused by heat, cell/battery shall be positioned away from the area where heat is generated in the application and the charger.

Please contact us when you need any help for custom battery packs and safety concerns

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