



## **LiFePO<sub>4</sub> battery quality and manufacturing overview**

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## Cells

The cells are the heart of a Lithium battery. All Amptron's batteries above 640Wh in capacity (i.e. 12V 50Ah and larger) use our very high quality A-grade prismatic cells that has a high discharge current rating and excellent cycle life performance. These cells are capable of producing a continuous discharge current of 3C (300% of its rated capacity in Amps) and a huge peak discharge current of 5 C (500% of its rated capacity in Amps) for 10 seconds.

Many other 12V LiFePO<sub>4</sub> batteries on the market use smaller and cheaper cylindrical cells with a lesser discharge capacity and shorter expected life.

### ***Amptron prismatic cells***



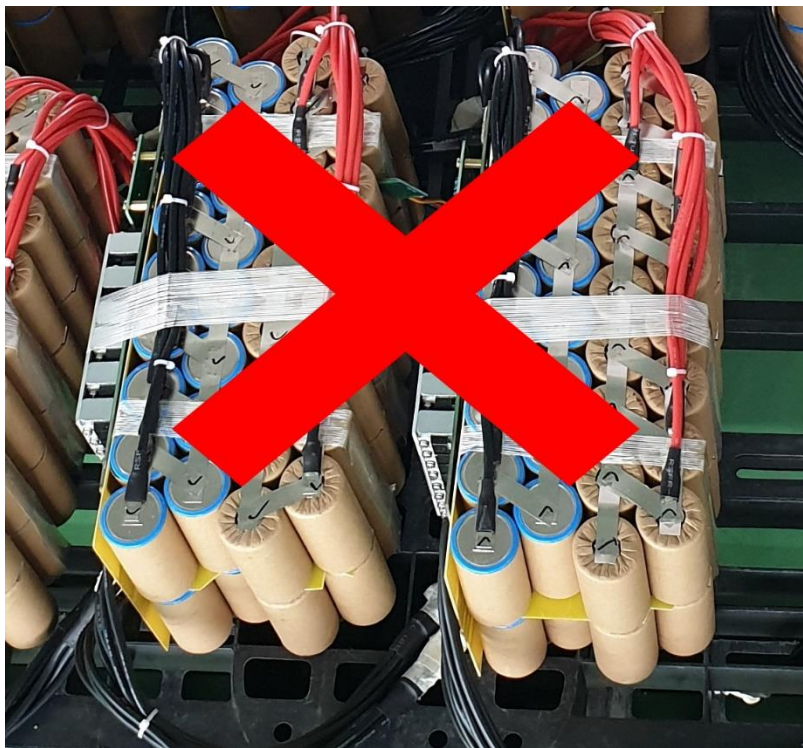
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## Design and construction

Most Amptron cells are bolted together to increase strength, conductivity and the quality of our LiFePO<sub>4</sub> batteries. Our bolted cells connect through Battery Management System circuit boards that provide additional mechanical strength, as well as balancing and protections for under voltage, over voltage, short circuit, over current as well as heat.

We use only large format cells with threaded terminals, i.e. no tiny welded tab 18650 or 26650 cells which are commonly used by low cost Lithium battery manufacturers. This design makes the battery pack assembly much stronger and more vibration resistant.

The quality of the outer casing is also very important. The packaging process and material of the outer casing directly determine whether the battery is anti-collision and corrosion resistant. Many poor-quality shells are made of ordinary snap-on combinations and the materials are substandard. A good quality lithium battery such as our Amptron batteries, will use an ultrasonic seamless welding process with flame retardant properties. Our batteries are IP65 rated. For larger custom designs, we may use a one-piece seamless metal casing.



*Figure 1 No tiny welded tab cell designs used*

## **Consistency**

The battery cell production lines are highly automated facilities.

The facilities have sophisticated materials analysis labs and reliability testing equipment, with qualified staff to use them. This is essential to enforce strict control of tolerances, including control of potential contamination and electrode coating imperfections.

The production lines are highly automated, utilising sophisticated precision automation equipment to produce reliable and predictable cells within narrow quality parameters. The production is further governed by comprehensive process controls and robust quality systems, ensuring consistency and reliability of produced products.

Many lower cost battery producers either have to source cells at discount prices or rely on manual cell manufacturing activities such as manual electrode winding or jelly roll winding with simple motorised mandrels, resulting in poor control of tolerances and deficiencies.

### ***Manufacturing facilities and machinery***







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## Certified

Our cells adhere to various quality standards and are certified by several international bodies:

- UN38.3
- MSDS
- CE
- KTC
- FCC
- RoHS
- SGS