

What type of cell technology do Ballistic Performance Components Batteries use?

Ballistic Performance Components EVO2 Batteries use custom designed lithium ferrous phosphate (LiFePO₄) cells. The chemistry was originally discovered by John Goodenough's research group at the University of Texas in 1996. Because of its relatively low cost, non-toxicity, excellent thermal stability, safety characteristics, good electrochemical performance, and high specific capacity it is the perfect chemistry for powersports applications. Simply, LiFePO₄ cells can deliver an enormous amount of power over a very short time and then recover very quickly.

Why are Ballistic Performance Components batteries different from other lithium based batteries?

The Ballistic Performance Components EVO2 battery uses custom made cells, cases, and connectors that are made specifically for the purpose of starting powersports vehicles. This is not a collection of generic commercially available parts wrapped in shrink wrap. This is a purpose built product designed, engineered, and assembled in the USA by an American company with over 20 years of professional motorcycle racing and manufacturing experience. We have made significant investments in materials, production capacity, and engineering that allow us to sell a lighter, smaller, more powerful battery at a better price and at the same time offering an exceptional 3 year warranty.

Is a Ballistic Performance Component EVO2 Battery a direct OEM replacement for my stock battery?

No. A Ballistic Performance Components EVO2 Battery is significantly smaller and lighter than the OEM battery. We supply foam in the packaging to make up the difference between the size of the battery and the size of the OEM battery box, but some modification may still be required. All equivalency charts and applications guides are based strictly on battery performance, not size or terminal location.

How do you compare lithium amp/hour and cold cranking amp ratings to traditional lead acid ratings?

Ballistic Performance Components batteries are designed to be starter batteries. Lithium Ferrous Phosphate technology works really well as a starter battery because it is able to deliver a large amount of energy in a short period of time and then recover. This is why they can be made much smaller and lighter than the lead-acid equivalent.

Lead-acid battery manufacturers have been using Amp-Hour (Ahr) ratings for years to indicate the cranking ability of their batteries. The Amp-Hour rating is a measure of how long a battery can deliver a specific current over the course of 60 minutes at a low discharge rate to half of nominal voltage. This rating has little to do with how a battery will actually start a vehicle. Because the rating itself is based on a complete discharge, under actual conditions the lead acid battery will deliver much less than the amp-hour rating. As a lead-acid battery discharges it begins to sulfate and its internal resistance increases. Also, discharging any battery to a complete discharge will damage it permanently.

A Ballistic Performance Components EVO2 battery will operate completely different. EVO2 batteries have significantly less internal resistance so they are able to discharge more of their capacity in a burst and still remain usable. Because the usable capacity is much greater than an equivalent lead-acid, a 6.9Ahr 12 Cell EVO2 is on par with a 20Ahr lead acid battery in actual performance as a starter battery. To illustrate this, we use the rating of Pb-eq A/Hr or lead (Pb) equivalent (eq) Amp Hour (A/Hr). The lead acid equivalent amp/hour rating is a simple way to compare the starting capacity of a LiFePO₄ battery with the starting capacity of a lead-acid battery.

Cold cranking amp (CCA) ratings for lead-acid batteries are a bit deceiving as well. CCA specs are based on amps delivered at zero degrees Fahrenheit at half nominal voltage (14.4V). This isn't a very useful rating as 7.2volts will not start a vehicle. What really starts a vehicle is current multiplied by available voltage (Watts). Once again, because a EVO2 has so much less internal resistance it is able to deliver more voltage for a given amp draw, and thus more usable starting power.

All batteries start to lose performance below 32°F (0°C), and LiFePO₄ batteries tend to fall off more dramatically. When the temperature of the EVO2 goes below 32°F (0°C) internal resistance starts to build in the battery and the amount of available amperage goes down as well. This should lower the Cold Cranking Amp rating, correct? **No!** LiFePO₄ batteries have the ability to build their own internal heat energy when a draw is put on the battery. This means that although it may be 0°F (-18°C) outside, the battery has the ability to raise its internal temperature to 58°F (14°C) in seconds with a 100amp draw. As the temperature rises inside the battery, internal resistance lowers and the battery performs just like it does when it is 60°F (15°C) outside. This means that the amount of available amperage does not change based on temperature.

What happens if I discharge my Ballistic Performance Components Battery?

One of the primary benefits of lithium ferrous phosphate batteries is that they discharge at an incredibly slow rate (10% per year of static use) so it is very hard to discharge the battery in a conventional application with an on board charging system. If for some reason you discharge your Ballistic Performance Components Battery the best thing to do is to recharge it as soon as possible. You should not allow the battery to discharge below 9.0Volts, as this can damage the cells. If the battery is drained below 6.0Volts then the battery is considered to be discharged beyond its capacity and it should be discarded according to local land fill regulations.

Do I need a special charger or can I use a standard automotive based charger?

No, you do not need a special charger. Any automotive or motorcycle based charger is acceptable to recharge your Ballistic Performance Components Battery as long as it has an automatic shut-off at 14.4V to prevent over charging. If you are using an automatic charge, be sure that it is **not** used in automatic desulfation mode designed for lead-acid batteries, this can damage the cells.

Ballistic Performance Components batteries are very different from a traditional lead acid batteries in that they do not require regular maintenance charging. A traditional lead-acid battery can lose as much as 1% of their capacity per day of static use. Ballistic Performance Components batteries will lose only 10% of their total charge over a twelve (12) month period of static use so a trickle charger is not required. Ballistic Performance Components batteries are compatible with your vehicle's charging system and can be used in a "total loss" racing application. Please refer to the detailed charging instructions included with your battery or at:

www.racecarbatteries.co.uk/ekmps/shops/raceuk/resources/Other/charger-questions.pdf

When charging a Ballistic Performance Components Battery with a traditional automotive or motorcycle based external charging device, the following input specifications are recommended:

Standard Charge: 2A @ 13.2-14.4V for approximately 45 minutes or until the battery registers 14.4V.

Maximum Charge Rate for Standard Automotive-based Charger:

EVO2 50 Battery (100-009) – 5A @ 13.2-14.4V for 15 minutes or until the battery registers 14.4V.

4 Cell EVO2 (100-010) – 10A @ 13.2-14.4V for 15 minutes or until the battery registers 14.4V.

8 Cell EVO2 (100-011) – 20A @ 13.2-14.4V for 15 minutes or until the battery registers 14.4V.

12 Cell EVO2 (100-012) – 20A @ 13.2-14.4V for 15 minutes or until the battery registers 14.4V.

16 Cell EVO2 (100-013) – 20A @ 13.2-14.4V for 15 minutes or until the battery registers 14.4V.

What is different about the Ballistic Performance Components BMS (Battery Management System) Charger?

The primary advantage to the Ballistic Performance Components BMS (Battery Management System) Charger is the balance charging function. The balance charging mode balances the voltage of each cell or cell pack individually using the Ballistic BMS port on 2011 and up EVO2 batteries. By balance charging your Ballistic Performance Components Battery you can insure that the battery is operating at its maximum power. **Periodic balance charging can also double the expected life of your battery.**

In order to balance charge your EVO2 battery you must connect the supplied BMS cable to the BMS port on the top of the battery along with the positive and negative leads from the charger. The BMS cable lead should connect to the individual port at the right side of the charger.

In this mode the built-in processor monitors the voltage of individual cells and controls input current fed into each cell to normalize the voltage.

The BMS port is only included in the latest versions of the EVO2 battery.

If you have an older Ballistic Performance Components Battery, the standard charge mode is your best choice.

Do I need to use a Battery Tender®?

No. You do not need to use a Battery Tender®, but you can. Because of the high discharge rate of a lead-acid battery they require a regular maintenance charge in order to remain functioning. A Ballistic Performance Components Battery only discharges at a rate of 10% per year of static use compared to a discharge rate of almost 1% per day of a traditional lead-acid battery, and thus they require no maintenance charge. If you wish to use a Battery Tender®, it will not hurt the battery as long as it has an auto shut off at 14.4volts. Overcharging any battery will cause it to fail.

If I use my powersports vehicle in cold weather which battery should I use?

If you regularly operate your powersports vehicle in weather below 32 degrees Fahrenheit (0°C) then we recommend you use the next size battery up from what is recommended in the application chart. All batteries start to lose performance below 32°F (0°C), and LiFePO4 batteries tend to fall off more dramatically. When the temperature of the EVO2 goes below 32°F (0°C) internal resistance starts to build in the battery and the amount of available amperage goes down as well. This should lower the Cold Cranking Amps, correct? **No!** LiFePO4 batteries have the ability to build their own internal heat energy when a draw is put on the battery. This means that although it may be 0°F (-18°C) outside, the battery has the ability to raise its internal temperature to 58°F (14°C) in seconds with a 100amp draw. As the temperature rises inside the battery, internal resistance lowers and the battery performs just like it does when it is 60°F (15°C) outside. This means that the amount of available amperage does not change based on temperature.

Do these batteries contain any liquid that can leak out?

No, the chemistry is a solid so there isn't any acid to leak out and damage your vehicle. Because the chemistry is a solid, the battery can be mounted in any direction and there are no worries about lead plates cracking from vibration.

How long should a Ballistic Performance Components EVO2 Battery last?

There are several factors that affect the life of a battery. Weather, temperature, recharge cycles, charging method, vibration and duration of static use can all have dramatic effects on battery life. A properly maintained EVO2 battery should last roughly twice as long as lead-acid used in similar conditions.

Can I use the battery in an application other than in a powersports vehicle?

Yes. These batteries are designed and developed to be used for powersports applications, but they may be useful for many other applications. However, our warranty only extends to appropriate powersports applications. If you have a question about applications other than powersports use, please call 843-552-7087 or email info@ballisticparts.com and our customer service professionals will be happy to help.

Do Ballistic Performance Components EVO2 batteries generate more heat than a lead-acid battery?

No. One of the advantages to the Lithium Ferrous Phosphate chemistry is that it generates its own internal heat energy. The outside heat of the battery pack itself will get no warmer than a lead-acid equivalent in normal use.

Is there a danger of a Ballistic Performance Components EVO2 battery exploding and catching fire?

No. The lithium ferrous phosphate used in the EVO2 battery is very stable and exhibits none of the thermal run away properties of Lithium Polymer batteries found in lap tops or phones. It would take extraordinary circumstances and abuse such as overcharging to the extreme to cause a lithium ferrous phosphate battery to melt down.