



## Frequently Asked Questions

1) Why buy A123 Racing batteries?

A123 Racing batteries offer superior power, minimal charge times, durability, and safety.

2) What are the A123 Racing cell specifications?

Our A123 Racing M1 cell is a cylindrical cell battery in an aluminum canister. It has a nominal voltage of 3.3V and a charge voltage of 3.6V. It has a capacity of 2300mAh, and is capable of 30C continuous discharges and 60C pulse (10 second) discharges. Each cell weighs 70 grams.

3) Do you need a special ESC to use A123 batteries?

You do not need a special ESC to run these batteries. The Low voltage cutoff should be set to 2.0V or in most cases it can simply be turned off. As always be sure to use the appropriate battery pack for your electronics application.

4) Is there a required modification to my vehicle to use A123 batteries?

Compartment Size -

When using these batteries it is important to note that the dimensions do differ from standard Sub-C packs. Our Hypersonic 6.6V 2300mAh pack is slightly taller but much narrower. The 6.6V 4600mAh pack is slightly taller and also wider. The 6.6V 2300mAh pack typically fits into most vehicles with little effort. The 6.6V 4600mAh pack may require more effort to install. In most cases a Velcro strap down will do the trick.

Connectors -

All A123 Racing packs are provided with a Deans Ultra Plug installed.

Protection -

There are no special instructions for protection. Follow the guidelines included in the instruction manual, and treat it as you would any other battery.

5) Are your chargers DC only? If so do I need a power supply or a 12-volt battery?

Our charger is a 12V DC charger so a power supply or a 12V battery is necessary. This way the charger is also portable and can use a car battery if commercial electric power is unavailable. It is capable of charging 1-3S A123 Racing cells in 15 minutes. (15-minute charging applies to 2300mAh packs).

6) Can I use my existing charger?

There are other chargers that have been designed to charge our A123 Racing batteries. We recommend that a charger be purchased that has some balancing capabilities, but some of these chargers do not balance the cells. For best performance and ease of use we recommend our Sonic Charger.

7) How important is Balancing?

Balancing is an important precaution when using Lithium batteries. A123 Racing batteries are not as prone to divergence as other batteries, but we still recommend balancing the cells to keep your pack in good health and ensure maximum cycles. If you are using a charger that does not balance, you should look into a separate balancer, or hand-charge each cell individually.

8) Are these batteries ROAR approved?

Our batteries, as with all other lithium batteries, are currently not approved for ROAR racing.

9) What is Lithium Ion Nano Phosphate?

Lithium Ion Nano Phosphate is the technology that allows us to create our unique battery. It is because of this technology that we have lower internal resistance, higher discharge rates, faster charging rates, and improved safety.

10) What kind of power are we talking about?

Our cells are capable of 30C continuous discharge and 60C pulse discharge. What is C? C is a rating that battery manufacturers use to show how much power can deliver based on their capacity rating. For example, our 6.6V 2300mAh pack can discharge at 30C so we take  $30C \times (2300mAh/1000) = 69$  amps. This is the amperage that the pack can deliver continuously. In comparison a 7.4V 2300mAh Li-Po pack is rated for 20C,  $20C \times (2300/1000) = 46$  amps.

11) How much voltage sag will I see?

Voltage sag is how much your voltage drops during the course of a discharge. When using Nickel Metal batteries this is frustrating because your battery vehicle only operates at full power for a portion of the run. A123 Racing batteries show very few signs of voltage sag. Refer to our discharge graphs, as the plotted line is very flat. What does this mean? This means that your car is going to run at or near full performance for the duration of the battery.

12) If there is no voltage sag, how will I know when the pack is getting empty?

Having very little voltage sag is a great benefit when you are using your vehicle, but it means that your battery will run out quickly once it starts to get low. In surface vehicles you will see the car start to slow down and soon after that it will be almost entirely drained. This scenario needs to be avoided when being used in an electric flight vehicle. As with any new electronics, you should always test your equipment before using it. For electric flight, we strongly recommend bench testing the battery, or making short flights to determine how long you can fly on your pack.

13) Charge times?

Our batteries boast the fastest charge time for any RC battery by 2X -4X. Our batteries can be charged to full capacity in 15 minutes. Charging at these high rates has little to no effect on the cycle life of the pack.

14) Will these batteries wear out my motors more quickly with the power they offer?

These batteries will not wear out your motor any faster than any other RC battery.

15) How safe are these batteries?

These batteries are very safe and abuse tolerant. They have many safety advantages over Lithium Polymer batteries.

They are not prone to thermal runaway, which is the leading cause of fire in Li-Po battery technology.

They will tolerate some amount of over-voltage before failing. Our batteries should be charged to 3.6V / cell. They will tolerate up to 4.2V / cell with little damage. Charging to 4.2V / cell repeatedly will have negative effects on your pack. Repeated abuse will yield much lower cycle life, and can result in pack failure.

These batteries also tolerate over-discharge. We recommend a cutoff voltage of 2.0V / cell but these cells will charge up perfectly fine even as low as 1.0V / cell. As with over-charging, it is not recommended to repeatedly discharge below 2.0V / cell as it will affect the cycle life and could cause pack failure.

These cells are manufactured with a Laser welded aluminum canister. This helps to prevent damage from physical abuse such as dropping or crashing. Even with this protective canister we highly recommend that you take extra care when handling and using your battery.

16) How do I store these batteries?

These batteries can be stored at any state of charge for short periods of time (3-5 days). These batteries can also be stored safely for long periods of time. At 50%-100% state of charge these batteries can be stored for 6 months. They can be stored for up to 12 months if they are charged to 100% state of charge beforehand.

17) What kind of life cycle can I expect from these batteries?

Because of our Nano Phosphate technology we are capable of delivering many more cycles than a Nickel Metal battery or even a Lithium Polymer battery. Your pack could see up to 1000 cycles before reaching 75% capacity. In an average RC application you would expect to see over 200 cycles before noticing any change in the battery pack.

18) Can I charge my Li-Po and other packs on the Sonic Charge charger?

The Sonic Charge system was specifically designed to charge our A123 Racing packs. It is NOT for use with any other battery pack, including NiCad, Nickel Metal, Lithium Polymer, or other Lithium Ion packs.

19) What is the charging voltage?

The required charge voltage for an A123 Racing cell is 3.6V. Therefore, if you have a pack that has 2 cells in series, it should be charged to 7.2V, and a 3-cell pack charged to 10.8V. A pack can be charged at 5C.  $5C \times (\text{Capacity}/1000) = \text{charge amperage}$ . For example our 6.6V 2300mAh pack  $5C \times (2300/1000) = 11.5A$ .

20) What RC applications can I use the batteries in?

We currently offer 3 different pack configurations, a 6.6V 2300mAh pack, a 6.6V 4600mAh pack, and a 9.9V 2300mAh pack. These can be used in any RC application that the user desires whether it be a brushless or brushed motor. It is also possible for a user to wire 2 packs together in series and/or in parallel. For example,

you could take two of our 6.6V 2300mAh packs and wire them in series for a 13.2V 2300mAh pack. It is always important to ensure that you are using them within their recommended specifications.

21) How do run times compare?

Because our batteries have a lower internal resistance the run time is higher than a battery with similar capacity. For example our 6.6V 2300mAh pack has runtime comparable to a Nickel Metal with 3300mAh. The reason our pack runs longer is that there is less energy wasted as heat in the pack.