



A guide to safe use of Li-Po batteries

Any rechargeable battery that is currently on the market has a risk of explosion, fire, and smoke emission if not handled properly. Despite the stories that have made the press, Lithium (Li-Po) batteries are not fundamentally unsafe, but they need to be treated with a lot more care and respect than NiCd or NiMh. Just because a supplier of a Li-Po battery does not label or warn of the dangers of their product does not make that product safe.

The principal risk is fire, which can result from improper charging, crash damage, or shorting the batteries, and this can be difficult to extinguish. Fire occurs due to contact between lithium and oxygen in the air. It does not need any other source of ignition or fuel to start, and burns almost explosively. A lithium battery fire is very hot (several thousand degrees) and is very good at starting additional fires that can result in loss of models, cars and other property. Homes, garages and workshops have also burned.

These warnings can be a little scary, and they should be as these Li-Poly packs can be very dangerous if not handled correctly, but please try and keep this information in perspective. Kitchen knives and chip pans can also be very dangerous if not handled properly and there will probably be more injuries caused by scalpels or super glue in eyes than batteries. The following precautions should help you enjoy using Li-Po batteries without having a major incident.

Charging Rules

Only charge Li-Po batteries on a charger specifically design for Li-Po batteries. Li-Po chargers are available at varying prices, depending upon the features, for the same price or, or lower than, NiMh chargers.

Safe Charge Pouch to be used to charge or store your LiPo batteries at all times. For maximum safety simply place your batteries in the pouch before charging.

Always ensure you use the correct charging voltage for the cell count. This will be 7.4v (2S) for car packs.

The maximum charge rate should be 1C, (e.g. 3.2A for a 3200 mAh pack, 5.0A for a 5000 mAh pack) for best charging, low charge rates should be used where possible.

Double check the charge voltage (or cell count), mAh, and current before each charge.

Never leave charging Li-Po cells unattended (at any charge rate).

It is best to charge Li-Po cells in an open space on a non-flammable, non-conducting surface (such as a bare cement floor, brick or quarry tile) and away from flammable materials.

Check your charger for safety. After charging, check battery with a digital voltmeter, the voltage for a fully charged pack should be between 8.32V to 8.44V.

Do not charge the battery inside your model, inside your car, on home furniture or wood floor/carpet, or anywhere near flammable material.

The minimum safe discharge voltage is 5.0V (2.5V per cell) when under load, or 6.0V (3.0V) per cell when not on load. With modern car packs, it's best to have a cut off set on your ESC (or separate cut off device) at 6.0 to 6.4v for a 2 cell (7.4v) pack. Most common speed controls won't give you the option to set a cut off voltage, but some products from Novak, LRP, Quark, and Castle Creations have the proper option built into them. Damage always occurs to 7.4v packs when they are at any lower voltage than 6.0 volts, regardless of whether the pack is under a discharge load or not. If the resting voltage is below 6 volts the pack has been seriously damaged because the voltage when it was under a discharge load was actually much lower. The lower the voltage and the longer it stays low, the more damage is occurring. Sometimes just one time well below 6 volts is enough to permanently damage a 7.4v pack to the point where it will no longer charge or perform. It just depends how far below, and how many times previously it's been below 6 volts.

Use connectors that can not be short circuited, or use silicon fuel tube to protect exposed connections. Under no circumstances should the ESC wires be soldered directly to your battery.

Do not short the battery as it may catch on fire. If you accidentally short a battery, place it in open space and observe the battery for 10 minutes. It may swell up and possibly even catch on fire.

Have a dry powder fire extinguisher or a bucket of dry sand within reach in case of a fire.

Cell balancing is a way of ensuring your Li-Po will deliver the maximum performance and capacity over a prolonged period of time, although some manufacturers claim that it is not required with their batteries.

Li-Po packs are designed for operating temperatures up to 40°C and under no circumstances must they become hotter than 60°C.

You may need to add weight to your car to balance it and/or reach the minimum legal weight.

If a pack is involved in a crash or is otherwise damaged, remove the pack from the model and inspect for damage to the pack and the wiring/connections.

Lithium polymer batteries do not have a hard steel case like a NiMh battery. Instead, a special aluminium foil encloses them. Therefore, they do not vent.

If the integrity of the battery is compromised, swelling will occur. If the battery is damaged and the case begins to expand, discontinue use immediately.

Only packs homologated by the BRCA will be permitted The current list can be found on the BRCA website <http://www.brca.org>

IF IN DOUBT ASK A MEMBER OF THE COMMITTEE FOR ADVICE BEFORE USING LIPO BATTERIES OR CHARGERS.