

Battery Storage and Charging

LiPo and LiFe Lithium Batteries are great however there are some risks and special charging and storage considerations to be aware of when using them.

Charging:

Always supervise Lithium Batteries under charge and discharge stages. That doesn't mean walk away from the charger. The QLD Fire Service (QFES) has data showing the vast majority of Lithium battery fires are either cells under charge or cells just after charging and in storage.

Always use a Smart Balance Charger or the Manufactures supplied charger.

For maximum reliability a recommended charge rate of 1 C of a battery is ideal, that means a 800 mAh, 2 cell, 7.4 volt pack would be charged at 0.8 Amps. You can exceed that charge rate however this will reduce the serviceable life of the battery and increase the fire risks. A smart charger will manage the charge current and you will notice that a pack's charge rate will drop automatically as the cell voltage increases. This doesn't lessen the risk of thermal failure during charging unfortunately.

Both Lipo and LiFe cells can start a fire, so it is a good idea to locate charging of cells away from all combustible materials and in a purpose built battery box or enclosure if possible. I use a "Bat-Safe" box to charge and store my lithium hobby cells, these boxes have a wiring port so you can put your cells inside and charge them enclosed. Any charging box must be vented and thermally insulated as lithium fires produce very high temperatures for a sustained period until all the battery material is burned off. There is no way to easily stop or extinguish Lithium fires as they chemically produce their own oxygen and will even reignite many hours after initially going out.

Storage and transport:

When not in use all Lithium batteries should be stored between 30 - 50% of full charge for safety and cell health. That means charging them up the night before sailing and putting the batteries into the car isn't recommended (as per the QFES note above). Charge and store batteries in a purpose built ventilated fire proof box away from anything combustible, have a linked smoke detector in this area that will wake you up if a fire starts.

Most Smart Chargers have a storage charge setting, so after sailing just connect up the packs and watch it discharge to the desired level while thinking about next weeks race tactics to beat Russell. Store the cells in a suitable box and it can double up as a transport box for the car as fully charged cells pose the highest fire risk.

Larger Battery storage boxes are available as you can only store a set maximum battery mah capacity in each box, check what you need as they are costly. There are other manufacturers and brands out there however these are mostly for commercial use and very expensive. If you Google LiPo RC battery fire storage tests there are a couple of good clips there testing all the current options. The soft battery bags are better than nothing however the YouTube clips show you what actually contains the volatility of LiPo fires.

Alternatives to Lithium batteries:

Panasonic Eneloop Ni-MH Batteries have some benefits over lithium. They don't spontaneously combust, they hold up to 70% of a full charge for up to 10 years (I tested this and it had 70% after 11 years). The pack in my DF65 is a 5 cell, 6 Volt, 800 mah and weights 70 grams, the 800 mah, 7.2 Volt, 2 s LiPo weighs 65 grams. Eneloop Charging is maximum of 10% of the pack rating so that is 0.08 Amps for the 800 mah pack. Eneloop Batteries are not as volatile like lithium and can be left on charge with less risk of combustion on a smart charger and can be safely stored fully charged. I have packs that are 12 years old and still reliably working confirmed by bench testing. Down side is, you will have to make up your own packs or order them through a model battery supply shop perhaps.

Damaged LiPo and LiFe Batteries:

Any physically damaged or swollen batteries must be removed from use immediately. Fully discharge the battery either by a discharge function of a Smart Charger or other means.

Disposal of flat batteries can be via some Waste disposal facilities (The Dump) or some retail outlets recycle them apparently.

In summary:

Lithium has amazing energy storage capacity for a compact size however has an increased risk of fire and requires supervision while under charge and discharge activities. The cells can fail without warning of swelling particularly while fully charged or under heavy discharge loads as well as from mechanical damage (dints, penetrations, etc). LiPo and LiFe fires are near impossible to extinguish and combust vigorously until all the battery material has been consumed while producing excessive amounts of toxic smoke that has significantly health risks if inhaled.

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