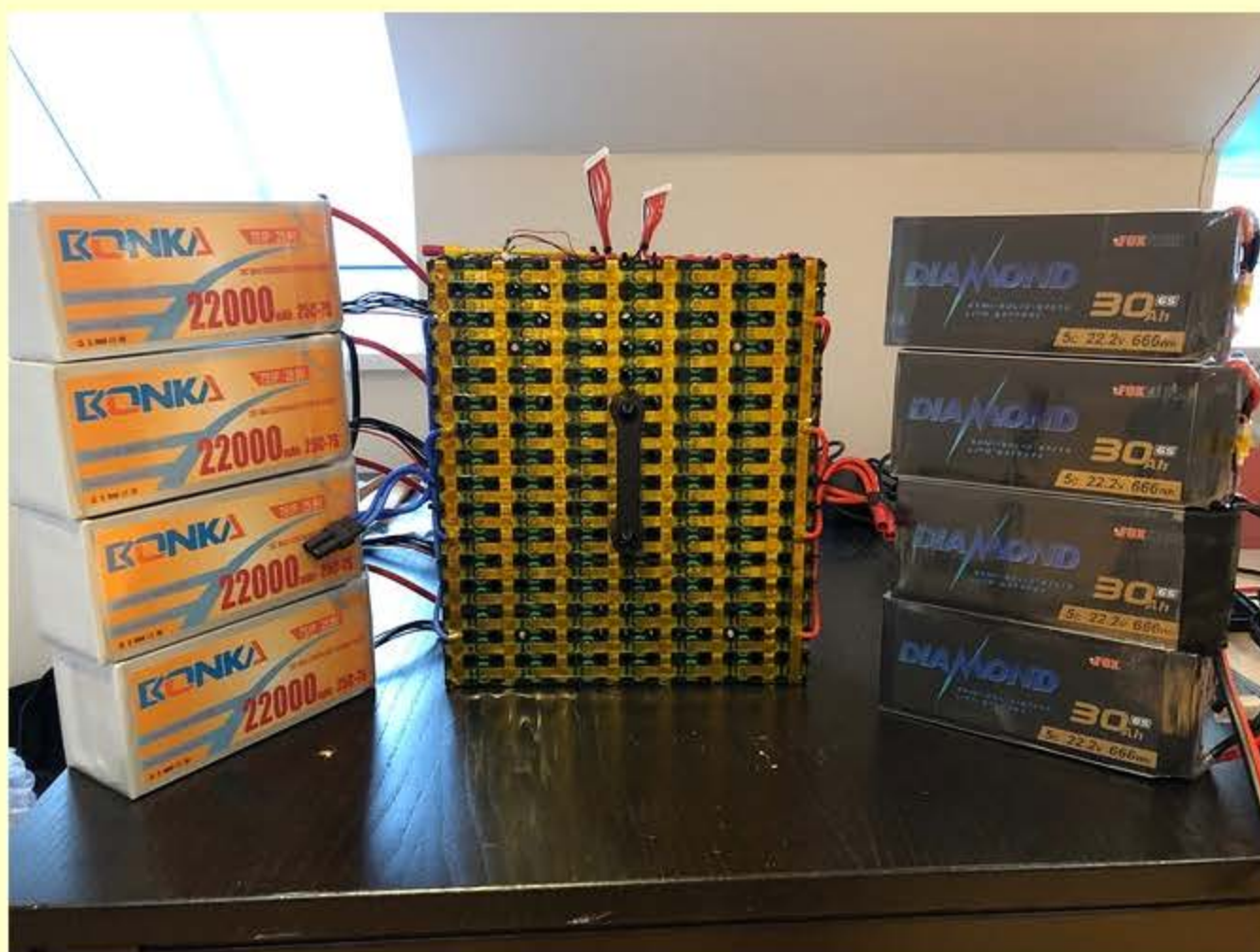




Battery Pack Comparison Conclusions.

Hi.

I have just about finished my comparative testing of Bonkas, Foxtech and 18650 cell battery packs. I have put all batteries on full load, compared energy delivered and looked at what gets hot. Here are my conclusions so far:



Foxtech:

The ultimate, money-no-object highest power density per weight is the Foxtech Diamond. A similar pack configuration to the Bonkas. I have posted my capacity investigation on these in this thread above.

These are what Foxtech call semi-solid lithium. They have impressive energy density specifications, which my testing has confirmed.

- 4 x Foxtech Diamond gives 7% more energy for 15% less weight than 4 x Bonkas.
- But costs 28% more.
- The Foxtechs are very difficult to get hold of (but I now have four!)
- They need re-wiring with thicker cable to work with OpenPPG.
- The Foxtech's longevity is yet to be tested.
- They are currently only available in a 6S configuration.

18650 pack:

If low cost is everything, then constructing a 14S16P battery pack from 18650 cells is the cheapest option. A 14S16P battery pack constructed from 224 x Sony VT6 cells will cost about 60% of the equivalent four Bonka packs. Even with all the additional holders, nickel strip and wiring, a 14S16P battery pack comes in at about the same power and weight as 4 x Bonkas.

- 11.2KG for the 14S16P vs 11.84KG for 4 x Bonkas.
- 2.12KW/H for the 14S16P vs 2.13KW/H for 4 x Bonkas.

The problem with a pack made from 18650 cells is that you have to do a lot of construction yourself.

Although this may be an enjoyable challenge for many, it requires tools that you may not have to hand and so need an investment in a Spot welder, High power soldering iron, and Hot air gun. Considerable care is required to do it properly.

Most online construction tutorials/methods are not intended to cater for the current draw that we need and so may not be appropriate. Sourcing all the components takes time.

It takes many man-days of work to finish a pack and ensure it is reliable.

It is very difficult to test/replace faulty cells.

16 x 18650 cells at 20 amp per cell (320Amp) puts them close to the edge of specifications for those cells so do they need to be kept cool and not enclosed.

I will do a post soon on how I constructed my 18650 pack (above center) and the problems I had to overcome.

Bonkas

Bonka cells are rated for much more current 25C = 550A continuous from a single pack.

But there is no way a Bonka pack could sustain that. The 18AWG cabling isn't up to it, and they get very hot at 150 amp continuous load. They rise in temperature by about 55degrees C (above ambient) after a continuous load of 150 amps (per pack) down to depletion.

So, in practice, the practical continuous load currents are similar for 14S16P as the Bonkas.

They also need to be kept cool

Conclusions:

For an easy life, go with the Bonkas – but I do not recommend enclosing the batteries like I have seen in some paramotors. They need airflow to keep cool and last long. Even to the point of putting spacers between and around the packs.

18650 cell batteries are cheaper and more flexible but are tricky and time consuming to construct.

The Foxtech diamond give an edge but are, as yet only available in 6S configuration and are untried in the field.

Whatever you do - get cabling and connector current capacities right and make sure the batteries have good air flow around them.