

# Bioenno Power 12 V LiFePO<sub>4</sub> Batteries

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Last year, I was a regular participant in ARRL's National Parks on the Air (NPOTA) Facebook group. In addition to discussing the various on-air activations, portable equipment and antennas were popular topics. Batteries kept coming up, and a perennial favorite was the BLF line of lithium iron phosphate (LiFePO<sub>4</sub>) batteries from Bioenno power. These are 12 V deep-cycle batteries, intended to provide continuous power, and are smaller and significantly lighter than conventional lead-acid batteries with equivalent rat-

ings. In other words, they are ideal for powering a portable amateur station. They are, however, quite a bit more expensive than equivalent SLA (sealed lead acid) deep-cycle batteries.

The Bioenno batteries have a built-in module that provides internal cell balancing and protection from overcur-

## Bottom Line

Although they are significantly more expensive than lead-acid batteries with comparable ratings, their light weight and long life make the Bioenno LiFePO<sub>4</sub> batteries a good choice for portable operations.

rent, overdischarge, overvoltage, and short circuits. This module also includes a charge controller. Note that you'll need charger designed for use with LiFePO<sub>4</sub> batteries, and not one for lead-acid batteries.

According to Bioenno, their LiFePO<sub>4</sub> batteries allow for extraction of more than 90% of the rated capacity without damage. They are rated for 2,000 or more charge cycles, while deep-cycle SLA batteries are often rated for 300 to 500 charge cycles depending on how far the battery is discharged. I have seen references that recommend limiting SLA battery discharge to about 50% or less for best life.

## Considering Which One to Get

Bioenno offers a wide selection of BLF-series LiFePO<sub>4</sub> batteries ranging in capacity from 3 Ah (amp-hours) to a whopping 300 Ah. When considering which battery to get, take a look at how much current your radio requires on transmit and receive, what mode(s) you will use, whether you will be operating casually (listening) or transmitting a lot, and how long you want to operate before recharging the battery. Keep in mind that high duty-cycle modes, such as FM or digital, will use battery capacity more quickly than SSB or CW. Online calculators, such as the one at [www.4sqr.com/Battery\\_Capacity/index.php](http://www.4sqr.com/Battery_Capacity/index.php), can help with planning.

Another point to consider is the maximum current the battery will need to supply. Some of the Bioenno batteries are rated for maximum continuous discharge current of 60 A or more, while others are rated for 10 A or less. A typical 100 W HF transceiver requires around 20 A for full transmit power.

For this review, we ordered two batteries. The BLF-1220A (see Figure 9) is a 12 V, 20 Ah battery rated for 40 A continuous discharge. It measures 6.5 × 4.3 × 3.3 inches and weighs 5.4 pounds. For comparison, a Duracell Ultra 20 Ah SLA deep-cycle battery measures 7 × 6.5 × 3 inches and weighs 13.3 pounds. Like all of the BLF series batteries, the BLF-1220A has red and black wires with Anderson

Powerpole connectors for the load (in this case, the radio) and a coaxial power jack for charging.

The second battery is the BLF-1209A, a 12 V, 9 Ah unit rated for maximum continuous discharge current of 12 A. This one measures 4.3 × 3.2 × 3 inches and weigh 2.6 pounds. Again, it's smaller and less than half the weight of a comparable SLA battery.

We also ordered the companion 14.6 V, 4 A charger, which can be used with either Bioenno battery. There's no metering, just an LED that indicates red for constant current charging and green for constant voltage charging. The manual cautions that the green light doesn't necessarily mean that the battery is charged, and recommends always charging for at least 5 hours to ensure a full charge.

## In the Field

I used the BLF-1220A on a number of NPOTA activations with my Kenwood TS-590S 100 W HF transceiver. To make life easier, I bought several Powerwerx adapters. One goes from the four-pin power connector on my radio to Powerpoles, and another adds automotive-style fuses. I also added a

Powerwerx inline meter that measures voltage and current and keeps track of amp hours used and other parameters. These are shown with the BLF-1209A in Figure 10.

I found that my transceiver draws 17.7 A on transmit (100 W output) and about 1.25 A on receive. During a typical NPOTA activation, I operated the radio between 80 and 100 W RF output, about 70% SSB and 30% CW, and usually running stations at a good pace until the pileup stalled and then changing bands or modes. Generally, my activations lasted a couple of hours, and I had plenty of battery power available. One time, I did run out of battery after about 3 1/2 hours and 332 contacts. Of course, it would last longer if I operated more SSB, operated at a slower pace (less transmitting), or turned the output power down a bit.

I was curious to see how the battery would do under really difficult conditions, so I used it at home to power my radio at 100 W during a CW contest. I called CQ and ran stations continuously while keeping an eye on the power monitor (that's a lot of transmit-

**Figure 9** — The Bioenno BLF-1220A battery and 14.6 V, 4 A charger.



**Figure 10** — The Bioenno BLF-1209A with Powerwerx inline meter and Powerpole adapters. Using these adapter cables, it's a breeze to switch among different radios and batteries.



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ting). Fully charged, the BLF-1220A indicated 13.1 V under no load and 12.5 V with the 17.7 A load from the radio. The voltage under load stayed quite consistent, dropping to 12.35 V after an hour and 12.15 V after 2 hours. The monitor said I had used 14.4 Ah. During the next 45 minutes, the voltage started to drop off more quickly until it dropped below 11 V and I was done. The meter said I had used about 17 Ah. I ordered the BLF-1209A primarily to

use with an Elecraft KX2. That radio has an internal 2.6 Ah battery which is great for short operations, especially if you run at 5 W output, but I wanted to go all day at 10 W. As it turned out, you can power a 10 W, energy-efficient radio like the KX2 for a very long time with a 9 Ah battery. I never came close to running out of power, and a lighter (1.4-pound) 6 Ah version would be sufficient for a typical day of operating. As a bonus, I had the 9 Ah battery with

me the day that the 20 Ah version ran out in the middle of a pileup. I was able to quickly swap in the 9 Ah battery and get back on the air using the Kenwood at about 50 W output. I made another 90 contacts before heading for home.

*Manufacturer:* Bioenno Power, 12630 Westminster Ave. Suite B, Santa Ana, CA 92706; [www.bioennopower.com](http://www.bioennopower.com).  
*Price:* BLF-1209A, \$99.99 (\$111.99 with 2 A charger); BLF-1220A, \$192.99 (\$212.99 with 4 A charger).