

## Ample Power Company

# Testing Batteries

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### But They're Almost New!

The conversation usually goes something like this. Caller: "There's something wrong with your regulator. It just doesn't charge my batteries. It put in a few Amps right after I turn on the engine, but then the alternator quits producing and the batteries never get full".

Us: "What is the voltage on the batteries when the Amps go down"?

Caller: "About 14.5 Volts".

Us: "Your batteries are the problem. The regulator has brought the batteries to an appropriate voltage. Now it's up to the batteries to accept a charge. They refuse to accept a charge, so they are either full already, or defective in some way".

Caller: "But they're almost brand new".

Us: "Have you broken them in"?

Caller: "What"?

Yes, batteries need to be broken in. When a battery is new, the plates are smooth from the active material being pressed into the grids. During discharge, the smooth plate surfaces increase in area due to etching of the active material. In effect, valleys and mountains are carved into the plates. With this increase in surface area, higher currents can be conducted, and an increase in capacity results. As a result, the battery will accept higher charge rates, and also support rapid discharges better.

We've seen brand new 8D batteries that won't crank a diesel fast enough to start it, but after a couple of deep discharges, the engine spins so fast that it starts almost immediately.

### Breaking Batteries In

As noted, new batteries need to be broken in before they start accepting a fast full charge. A special feature of Ample Power regulators prevents them from overdriving a battery that won't readily accept a charge. Besides monitoring temperature and making adjustments to charge voltage, Ample Power regulators employ special microcomputer hardware and software that sense when a battery doesn't accept charge normally, and backs off to prevent permanent battery damage.

Breaking a battery in properly will not only permit faster

charging and discharging, but it will also provide a 15 to 30% gain in Amp-hour capacity.

To break a battery in requires from 1 to 5 complete discharges, followed by a full charge. Fully charge the batteries before performing a complete discharge. To discharge fully, turn on a load that is approximately 5% of the Amp-hour rating of the batteries. That is, for a 100 Amp-hour battery discharge at about 5 Amps. Continue the discharge until the battery voltage falls to 10.5 Volts.

The Ample Power Energy Monitor/Controller is ideally suited for break-in discharges since it not only monitors current, but can sound an alarm when voltage falls to 10.5 Volts. In the process of breaking in the battery you can also determine what's its actual Amp-hour capacity is. Just read it off the Energy Monitor/Controller when the alarm goes off.

Even after one complete discharge and recharge you'll note an improvement in charge acceptance. Do at least three, however, to give your batteries a good initial workout.

### Are They Still Any Good?

When batteries aren't new, and aren't accepting current as expected, either they need another deep discharge activation cycle, or the batteries are at the end of their life.

Batteries that are inactive for long periods don't act normal on the first discharge. They need a deep discharge followed by a vigorous charge to start accepting current normally. It may take more than one discharge and recharge cycle to make the batteries work as expected. If you've done this, and the batteries still refuse to charge and discharge properly, they are probably ready for the recycle bin.

### The Overnight Test

One way to evaluate battery health is to fully charge the batteries and then disconnect them so that you know there is no way they can be discharged by sneak loads. After a resting period of 24-hours, measure the voltage across the terminals with a good digital voltmeter. If the batteries aren't holding 12.6 Volts, (12.8 for gel cells), then they are in poor health.

We've talked to people who own batteries that drop to about 12-Volts after a 24-hour rest. Because the batteries were only a few months old, they refused to believe they were bad. After two years of complaining about poor battery service, they are still ruining vacation time by excessive engine run-

ning, and we might add, wasting our time trying to find some alternative explanation.

### **Capacity Testing**

The best way to determine the health of a battery is a full blown capacity test. As previously mentioned, this involves charging the battery fully, and then placing a load on the battery which is about 5% of the expected capacity.

We suggest a capacity test at least once a year. Typically the test would be done prior to the vacation season, and most

certainly before one leaves for an extended trip. Remember to log the capacity test in your record book so that you can compare capacity later.

### **It's Your Choice**

Instrumentation and regulation equipment is available to take the mystery out of battery management. Techniques are available to determine battery capacity and ultimate health, and Ample Technology can provide assistance where necessary to sort out what may be confusing information. If you choose to have Ample Power, you will!