

# Ample Power Company

## Winterizing Battery Banks

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### Introduction

In many places, boats and motor coaches are layed up for the winter months. The question always arises, what should be done to the batteries? Should the charger be left on or off? Can all the batteries be hooked in parallel and charged from a single charger? Should the charger be placed on a timer?

Unfortunately, there's no one right answer to any of these questions. Different battery technology and winter circumstances dictate an individualized regimen.

### Charge Fully before Lay-Up

Always charge batteries fully before leaving them unattended. When you layup batteries for any length of time beyond a few weeks leave some sort of charger attached which will keep up with battery self-discharge. Ideally the battery voltage should be maintained between 13.2 and 13.6 Volts. A small solar panel is often sufficient to maintain a battery. Solar panels can overcharge, however, so be sure to use a regulator on larger panels. If you can't leave a charger attached, apply a full charge every 3-4 weeks. Self-discharge is less in cold weather, so the time between full charges can be longer, perhaps 8-10 weeks during northern winters.

Basically, a full charge is a process where a temperature corrected absorption voltage is applied to the batteries until battery current declines to a low percentage of battery Amp-hour capacity.

Batteries which are fully charged won't freeze in weather typical of the U.S., except perhaps in Alaska. Batteries that are not fully charged may freeze, and the expansion of the ice will probably fracture the cases.

### Battery Types

As you may know there are four distinct types of lead-acid batteries. They are:

- liquid electrolyte, lead/antimony plate;
- liquid electrolyte, lead/calcium plate;
- gelled electrolyte, lead/calcium/tin plate;
- absorbed electrolyte, lead/calcium/tin plate;

### Lead-Antimony Batteries

Antimony is used as a stiffener in the grids of lead plates of deep cycle batteries. While antimony makes the plates

stronger, it also causes battery cells to self-discharge more rapidly. Self-discharge is a deleterious discharge because it creates a hard lead sulfate that crystallizes and ultimately destroys the battery.

The only way to avoid self-discharge is to keep lead-antimony batteries on a charger when not in use. Self-discharge lessens as temperatures decline, so if it's cold enough, then a full time charge isn't necessary. Be sure to do a full charge at least once a month in very cold weather, and every two weeks if it gets above freezing.

### Lead-Calcium Batteries

Batteries made with lead-calcium plates, such as the so-called maintenance free types, have low self-discharge as long as the weather isn't too warm. These batteries can be left fully charged for several months without experiencing sulfation. It is good to bring them to a full charge a couple of times during the winter.

### Absorbed Electrolyte Batteries

Absorbed electrolyte batteries have most of their electrolyte captured in a fiberglass mat. Plates are made of lead and calcium and some tin may also be used. Because there is no antimony in the grids, self-discharge is quite low. Fully charge the batteries before laying up the system for the winter, and apply at least one full charge during the winter.

### Gel Batteries

Gel batteries have the lowest rate of self-discharge, and can be left months without a charger attached. Just be sure to bring the batteries to a full charge before leaving them.

### Mixed Battery Systems

Many systems have two different types of batteries for house and starter. Follow the recommendations for the type of battery that requires the most charging during the winter. If you leave a charger hooked up, it's permissible to connect all the batteries in parallel. If your area is subject to frequent power outages, be sure to check charger operation frequently, since it isn't a good idea to have different battery types connected unless they are being charged.

### Don't Forget Small Loads

Often, there are a number of small loads on the batteries such as clocks, instrumentation, and control panel indicators. If

you're going to leave the batteries without a full-time charger attached, then it would be wise to lift one of the battery leads to make sure that there are no stray loads discharging the batteries.

### **Don't Forget Temperature**

When you charge the batteries for the last time before lay-up,

be sure to get a voltage high enough to fully charge the batteries at their present temperature. Refer to the publications mentioned earlier.

Just as important is actually reaching a full charge when called for during the lay-up period. If the batteries are really cold, it will take a high voltage to reach that full charge.