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By Stephen Sommer

Battery Alternatives

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Are the new AGM batteries really worth the extra cost? Couldn't I just use few extra golf cart batteries and maybe replace them a little more often, and still save some money?

Choosing between flooded batteries and AGM (Absorbed Glass Mat) batteries is not a simple matter of economics. Usually there is a best choice of battery regardless of the cost.

To help clarify the issue, I will review the most popular battery choices and indicate the relevant technical aspects and which applications are best suited to that battery type.

Flooded Lead Acid: These are the batteries that have removable caps on top that must be removed to maintain the proper level of acid and water solution. These batteries require good ventilation, because they normally vent explosive hydrogen gas and corrosive acid vapor, mostly when charging. They are the most forgiving of abuse, because they can be badly overcharged and most of the damage is corrected by replacing the lost water. They are not forgiving of neglect though. If the charging system regularly overcharges them even a little bit, they will need water regularly. If the water is not replaced regularly, they will be damaged. Historically, there is another advantage of a flooded battery: you can check the charge level with hydrometer. This was a huge advantage before high precision, low cost digital meters and battery monitors were commonly available. A hydrometer is still useful for diagnosing failures of individual cells.

The best thing about flooded lead acid batteries is the price. Because of a large market in the golf cart industry, they have become a "commodity", which are priced well when compared to actual cost of making them. There are also some high-end flooded lead batteries (usually available in larger sizes) that are very long-lived, but expensive.

The best application for flooded batteries is where there is good ventilation available and access for maintenance isn't too difficult. They are also most tolerant of locations which are hotter than ideal, such as engine rooms. Higher temperatures cause accelerated water lose, especially when the charger does not employ a temperature sensor to reduce the charging voltage, as it gets hotter.

Sealed batteries, including AGM and Gel-Cells: Both of these "sealed" battery types are not really sealed. Both have vents, which will allow explosive gases to escape when a small pressure is produced. Under normal conditions gases are not produced enough to open the vents. They will vent if overcharged. The Coast Guard believes that you can't count on avoiding these venting conditions, and does not allow any significant relief from venting requirements.

Many people are willing to bet on avoiding venting conditions and install "sealed" batteries in locations with very poor ventilation. Without providing ventilation, or easy maintenance access, or the need for exactly level positions, some very imaginative mounting locations are possible.

If you do elect to use any of these imaginative locations, keep the following in mind: If you pack several batteries in the same location, you may have a heat problem. Batteries will produce a significant amount of heat, when charged, so you should provide some "clean" ventilation. That means ventilation into interior spaces, just to vent heat, and not (normally) hydrogen and acid fumes. "Imaginative" locations might involve long battery cable runs. You can always make up for distance with heavier gauge wire, but that much copper can be expensive and heavy.

With poor ventilation, you must do everything possible to avoid venting. The first thing to do is use a state-of-the-art battery charger, with a temperature sensor. It would also be wise to install some sort of over voltage alarm, to guard against other sources of over charging, such as malfunctioning or improperly set-up battery chargers, engine alternators, or solar panels. Some battery monitors and inverters have the capability of activating an external siren if an over-voltage condition is detected.

On the cost side, "sealed" batteries are two to four times as expensive as flooded batteries. Use them where maintenance access is poor and where the ventilation is into inside spaces.

Which Sealed battery? AGM or Gel-Cell? There is very little difference on the cost side, so once again, we should look at the technical differences. AGM's differ from Gel-Cells in that they have a higher surge power capability. They are probably the only true dual duty battery with both deep cycle and engine starting capabilities. We don't care very much about the engine starting capabilities of house batteries, but today's inverters make similar demands on our batteries. If you have a relatively small house battery bank, and a 2000-watt inverter with a 5000-watt surge capability, you need AGM batteries. If you have a large battery bank, even a large load like this can be handled well by many Gel-Cells all contributing at the same time.

The jury is still out on the lifetime issue of the Gel-Cell vs. AGM debate. The answer still depends on whom you talk to. I am open-minded to emerging information, but so far, I still believe that Gel-Cells have a longer service life.

If you have a small battery bank, where your amp-hour capacity is anywhere near the maximum surge amps possible, use AGM batteries. If you have a large battery bank, use Gel-Cells.

Stephen Sommer is a degreed electrical engineer with extensive experience in electrical, mechanical, refrigeration and air conditioning systems and holds a USCG Masters license. He consults in all areas of yacht systems, which include all the equipment on board yachts beyond a basic hull and motor or sails.

Have a systems problem or question? Ask Stephen Sommer.
Email: steve@boatek.com