

THE COMPLETE GUIDE TO AGM BATTERIES

WHAT IS AN AGM BATTERY?

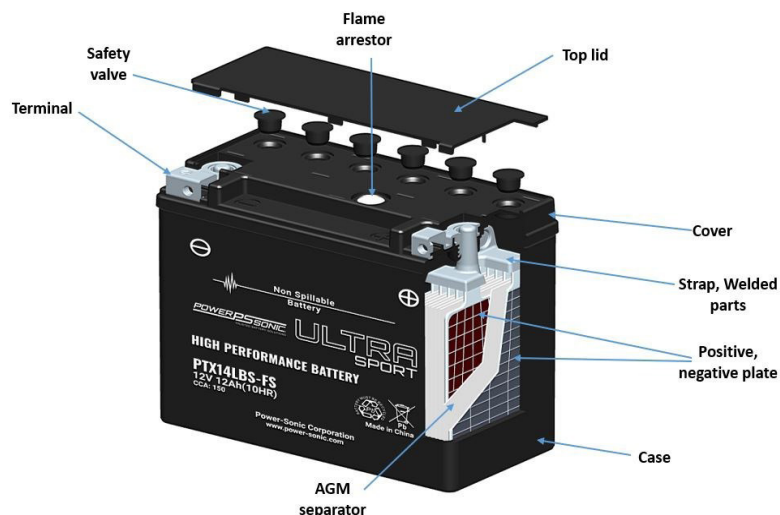
You've heard the term AGM battery before and may even know that it stands for Absorbent Glass Mat. But, what does Absorbent Glass Mat (AGM) actually mean and how does that enhance the battery's performance over standard lead acid batteries?

Let's review some basics of the SLA (sealed lead acid) battery construction. All SLA batteries are comprised of lead plates (positive and negative) and electrolyte that are then arranged into "cells" and placed into a battery case. Some of these batteries are also valve-regulated, which allows for the escape of minor amounts of gas that occurs during the recombination process during charging. Although these batteries allow gases to escape, they are spill-proof batteries (sometimes called valve regulated lead acid or VRLA), and allow for safe operation in almost any position (the only limitation is they are not recommended to be used upside down). Because they are sealed, you don't need to add electrolyte after the manufacturing process, and any gases that are generated go into a recombination cycle.

AGM BATTERY CONSTRUCTION

In AGM type batteries, the construction follows the same basics as standard SLA, with the addition of a fiberglass mat that is placed between each negative and positive plate to absorb the electrolyte. Since the mat acts like a sponge with the electrolyte, the battery becomes non-spillable.

The AGM battery holds the electrolyte in place and works by allowing the electrolyte to be passed through the fiberglass mat, creating maximum surface area for the electrolyte to touch the plates without it flooding the battery with too much fluid. AGM batteries contain only enough electrolyte to keep the mat wet and if the battery is broken no free liquid is available to leak out. This allows for less electrolyte in the battery while still providing the same energy as traditional SLA batteries.



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TYPES OF AGM BATTERIES

When most people think of AGM batteries, they likely think of deep cycle battery applications. However, not all AGM batteries are deep cycle. While a popular choice for deep cycling, as an AGM battery has a depth of discharge (DoD) of 80% versus a standard flooded battery which has a DoD of 50%, it is also a popular choice for starter batteries. This is because it has low internal resistance and can provide high current loads quickly. AGM batteries are also being used as start-stop batteries in modern cars, this is due to flooded batteries not being robust enough to handle the repeated cycling in start-stop applications which can cause the battery to fail after only a couple of years use.

For example, at Power Sonic we offer our AGM technology in both deep cycle AGM batteries (the PDC line) and as a popular option in our PowerSport family (Super Sport, Ultra Sport AGM, and our Stop-Start AGM lines). However, AGM is also the technology we use in our general purpose (PS) and long life (PG) families of products as the Absorbent Glass Mat separator maximizes the surface area of the electrolyte improving battery performance.

Each cell in an AGM battery has 2 volts so AGM batteries are available in a variety of voltages including popular 6V and 12V models.



CHARGING AN AGM BATTERY

One of the advantages of an AGM battery is they can be charged up to five times faster than a standard flooded battery. As with all sealed lead acid batteries, AGM are sensitive to over-charging, we recommend this guide to charging sealed lead acid batteries to ensure get the most out of your AGM battery.

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ARE AGM BATTERIES RECYCLABLE?

Yes AGM batteries are recyclable. More than 98% of an AGM battery can be recycled. We in the battery industry are very proud of the fact that lead acid batteries are one of the most highly recycled products on the planet. AGM batteries are environmentally friendly and easy to recycle, they can be recycled at almost all recycling centers, along with many automotive outlets and thousands of other locations.

AGM VS FLOODED BATTERY

There are many benefits of AGM technology over its older flooded battery construction. One big benefit of the fiberglass mat is that since the mat holds the acid, the battery is less likely to sulfate. This characteristic is what allows it to reach a deeper DoD than it's flooded equivalent.

The lower internal resistance of the AGM battery also has a lower self-discharge rate and therefore doesn't require a topping charge as frequently as a flooded battery would in long term storage conditions. It is important to note that AGM batteries still must be charged before storing and will require maintenance charging while in long term storage but will charge faster than a flooded battery.

Some advantages that AGM has over flooded batteries (as well as faster charging) are increased cycle life and vibration resistance. This is because the combination of the tightly packed AGM battery and the mat inside act as a damper, which are characteristics that lend nicely to power sport applications. Another benefit of the mat is that the battery requires less electrolyte than flooded batteries, which decreases its weight.

However, one of the down sides to the AGM battery is its cost – at slightly higher than flooded, you will pay more for a battery that doesn't need to be maintained in the same way a flooded battery does. In fact, cost is one of the reasons flooded batteries are still commonplace (usually seen more in motorsport applications).

AGM BATTERY VS GEL

Another popular alternative to flooded and AGM type batteries is the Gel battery. A Gel battery is still maintenance-free, its cells are sealed, and it uses a recombination process to prevent the escape of its gasses. What varies with a Gel battery is the electrolyte itself is a thixotropic gelled sulfuric acid.

When comparing a Gel battery to an AGM battery, you will see that the Gel battery's rated capacity will decline much faster than an AGM battery's as the ambient temperature get colder (below 32 degrees F). A Gel battery is also does not perform as well in high rate or starter applications as an AGM, which is why you don't see Gel power sport batteries. On the plus side for Gel, it is more acid limited, giving it a slightly longer service life in some applications. Power Sonic offers Gel batteries in our DCG (Deep Cycle Gel) and our 2-volt OPzV Tubular Gel lines.

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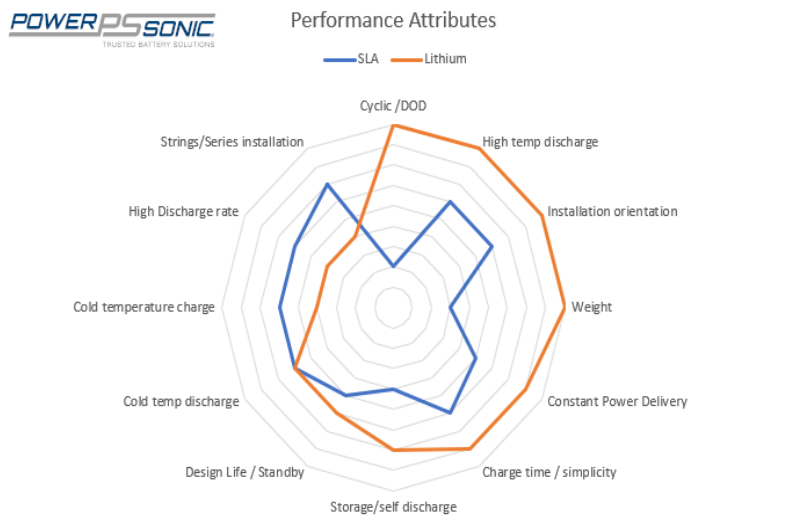
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AGM VS LITHIUM BATTERIES

There are many differences between AGM and lithium batteries. When it comes to choosing the right battery for your application, you need to understand exactly what you are looking to get out of the battery. Is it a deep cycling application, a high rate discharge application or a float standby application? Does the application already have a built in charger for a specific chemistry? What is your budget? etc..

We at Power Sonic have put together a comprehensive guide to the differences between sealed lead acid batteries and LiFePO4 batteries, this should be able to help you to see whether AGM is the better choice for your application.



To summarize, depending on the application and your budget, you will find the AGM battery to be the more superior battery over flooded battery types due to its lower weight, lower maintenance, and overall enhanced performance. You will also find AGM to be a popular choice over the Gel batteries as they are much more common and usually less expensive. The battle between AGM and lithium batteries will depend on your application and what you are looking to get out of the battery.

If you have any questions about which battery is more suitable for your application, please feel free to call or email us.

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