

TECHNICAL BULLETIN

Flooded, AGM or Gel...Which is Best?

East Penn produces a complete line of starting, deep cycle and dual purpose flooded, Gel and AGM (Absorbed Glass Mat) batteries for Marine, RV and special applications. This diverse product offering enables East Penn to be objective as to the advantages and disadvantages of each type of battery.

Below is a chart that rates flooded, AGM and Gel battery designs against numerous battery criteria that pertain to application use. On the reverse side there are definitions for these terms to explain their relevance and importance in evaluating the different types of marine batteries.

Battery Rating Criteria	FLOODED				
	Starting Design	Deep Cycle Design	Dual Purpose Design	AGM Design	Gel Design
Starting Efficiency (@ 0°F)	4	1	2	3	2
Reserve Capacity (@ 25 amps)	1	3	2	4	4
Deep Cycle Capabilities	0	3	2	3	4
Dual Purpose Capabilities	0	2	4	4	3
Non-Spillable Rating	0	0	0	4	4
Minimal Gassing	3	1	1	4	4
Recovery – Discharged Service (below 50%)	1	2	2	3	4
Quickest Recharge Time @ 14.1 V	1	3	2	4	4
Quickest Recharge Time @ 14.5 V	2	3	3	4	N/A*
Storage/Shelf Life	4	1	2	4	4
Deep Cycle Life (BCI 2 hr. life)	0	2	1	3	4
Less Sensitive Charging	3	4	4	2	0
Low Initial Cost	4	2	3	2	1
Long Term Value - Cycling	0	2	1	3	4
Durability – Overcharge Situations	0	2	1	0	0
Durability – Ultra-Deep Discharge	0	3	2	4	4
Water Retention	4	1	2	4	4
Water Replacement	0	4	4	0	0
Terminal Corrosion Resistance	3	2	2	4	4

*above recharge limit

Rating scale: 4-Best 3-Excellent 2- Very Good 1-Good 0-Poor

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BATTERY RATING CRITERIA

Starting Efficiency rates the ability of the battery to provide high amperage to “crank the engine” up to the starting RPM. This current must be delivered quickly and as long as thirty-seconds at a time at 0°F. This power comes off of the surface of the plates; therefore, many thin plates will deliver the highest starting power.

Reserve Capacity @ 25 Amps @ 80°F represents the time the battery will continue to operate essential accessories if the alternator or generator would fail. High reserve capacity ratings allow the use of more accessory power demands. This slower, lower discharge comes from the thickness of the plates. Thicker plates will deliver a higher reserve capacity.

Deep Cycle Capabilities represents the ability of the battery to deliver small amounts of current over longer periods of time allowing the battery to withstand long, deep discharges and long, slow recharges. Again, thicker plates perform better than thinner plates, typical of starting applications.

Dual Purpose Capabilities represents the ability of a battery to provide ample starting power and moderate deep cycle service. This design is a compromise between a starting design and a true deep cycle design.

Non-Spillable Rating is the degree of which the battery design ensures the prevention of leaks and spills allowing for added safety and numerous installation options.

Minimal Gassing is attributed to the battery's ability to control internal gas pressure, preventing capacity loss from extra gas seepage and allowing care-free use around sensitive electronic equipment. This assumes proper charging, because over-charging will drive hydrogen and oxygen from any battery design.

Recovery from Discharge Service (below 50%) demonstrates the ability of the battery to be continually recharged from a discharged state below 50% of its full capacity without significant loss of capacity or life cycles.

Quickest Recharge Time @ 14.1 V or 14.5 V shows the efficiency of a battery's re-charge ability allowing for shorter charging times. Gel batteries are required to charge at a maximum of 14.1 V, but only need to have 105% of the amp hours returned because they recharge so efficiently. In contrast, AGM batteries are required to be charged at a maximum of 14.5 V, but will need 110% of the amp hours returned. A flooded battery can usually be charged at yet a higher voltage, depending upon lead alloy; however, they will require 120-130% of the amp hours be returned to the battery by the charging system.

Storage/Shelf Life represents the rate at which a fully charged battery that is not being used can retain its charge. If the battery has a long storage life it will have a low self-discharge rate and will be able to be inactive for a longer period of time (typical of off-season storage) without losing its capacity ratings or experiencing a significant decrease in its level of charge.

Deep Cycle Life (BCI 2 hr. life) shows the battery's ability to be discharged to a low state of charge and then recharged for numerous cycles in controlled lab test conditions.

Less Sensitive Charging shows the degree at which battery charging requires strict voltage control in order not to damage or shorten the battery's life. For example: Gel cell batteries must be limited to 14.1 V while AGM batteries can withstand up to 14.5 V recharge voltage.

Low Initial Cost compares the initial purchase price.

Long Term Value-Cycling determines the long-term value of the battery by comparing the initial price in relation to the life cycles the battery design will deliver.

Durability – Overcharge Situation evaluates the battery's resistance to damage or capacity loss when it is overcharged many times.

Durability – Ultra Deep Discharge evaluates the battery's resistance to damage or capacity loss by continually discharging it close to its zero capacity rating.

Water Retention shows the ability of the battery design and alloy composition to decrease the amount of water lost during the battery's life. Some batteries are designed to lose very little water during their life eliminating the need to add water.

Water Replacement indicates if the vent caps or filler plugs can be removed to replace water that may be lost due to excessive gassing from overcharging situations.

Terminal Corrosion Resistance is the battery's design attributes that prevent acid residue that might cause unwanted corrosion on the terminals and attached wiring and/or nearby equipment. Terminal corrosion can also be relative to the battery's non-spillable rating.