



Battery Care – QuickFacts / Flooded Lead/Acid (FLA)

Care & Maintenance

There are two key maintenance aspects to FLA batteries

- Fluid Level
- Charging Cycles

Fluid levels should be checked regularly. If the fluid level in the battery drops to the point where the lead plates are exposed, severe and permanent damage can and likely will occur

Several factors cause your fluid level to drop quickly

- High ambient temperature (25 degrees Celsius or higher)
- Deep discharge and recharge cycles
- Equalization (see charging cycles)

Battery inspection for fluid levels should be checked weekly under these circumstances, and monthly otherwise.

Tip: Set a reminder on your phone

- Use only **distilled** water – available at most pharmacies and big box stores
- The fluid level should cover the lead plates and be just below the bottom of the inspection hole.

Tip: Using a flashlight is makes it a lot easier to detect fluid level!

SAFETY:

It is advisable to use both gloves and **SAFETY GOGGLES**. Escaping bubbles can cause **SULFURIC ACID** to splash and blind you!

Those same bubbles are **HYDROGEN GAS** which is **HIGHLY EXPLOSIVE**. **Keep spark and flame away from battery area!**

Tip: Keep a small flashlight and goggles in your battery compartment



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Charging Cycles and State of Charge (SOC)

FLA batteries have four (4) distinct charging cycles and voltage settingsⁱⁱ.

- Bulk (Constant Current Charge)
- Absorption or Saturation
- Float
- Equalization

BULK: This is where the battery receives about 70% of its charge capacity using a Constant Current at about 14.8 volts.

ABSORPTION: The voltage is lowered and an additional 25-28% of the charge capacity is delivered. This voltage reduction (about 14.2V) is required as battery's internal resistance increases and fluid saturates.

Keeping a battery in BULK or ABSORPTION for too long can overcharge and damage the battery

FLOAT: This is the final regular charging stage and is necessary for battery health and longevity. Here the voltage is dropped to 13.6 volts. This also prevents the battery from self-discharging – a trait FLA batteries have.

EQUALIZATION: The last charging cycle, equalization, is a maintenance cycle which not all battery chargers or solar controllers may be able to perform. During this stage, the voltage level is raised to a higher than normal rate for a short period of time. This 'burns off' the lead sulphate layer that is responsible for shortening battery life. *The battery may become quite warm, fluid levels drop quickly and larger than normal amounts of hydrogen gas will be vented.*

Voltage Levels and State of Charge

An approximate idea of the SOC of an FLA battery is indicated by its charge level:

| Voltage | SOC* | Behavior | |
|---------|------|---------------|---|
| >12.6 | 100 | Fully Charged | <ul style="list-style-type: none"> • Voltages are approximate and can be influenced by temperature – and any potential load on the system • Voltage is best measured after a charge and battery has rested at least 60 minutes at a normal room temperature |
| 12.5 | 90 | Typical | |
| 12.4 | 80 | Operating | |
| 12.3 | 70 | Range | |
| 12.2 | 60 | Lower | |
| 12.1 | 50 | End | |
| 12.0 | 50 | Of Range | |
| 11.9 | 40 | Reduces | <ul style="list-style-type: none"> • Repeated discharges into this zone will reduce your battery life |
| 11.8 | 30 | Life | |
| 11.6 | 20 | Expectancy | |
| 11.3 | 10 | Danger | <ul style="list-style-type: none"> • Permanent damage if left in this SOC |
| 10.5 | 0 | Wil Robinson! | |

***What is SOC?**

- SOC refers to "State of Charge", or at what 'level' the battery is currently at and referring to where it stands as to its (useable) capacity.

ⁱ Battery area must be well vented and away from open spark or flame. FLA batteries should never be used/charged within a living space.

ⁱⁱ Note: All charging voltages may vary slightly by manufacturer – check their technical data when setting your charger.