



GreaseSpot #10 – Off Season Battery Storage

The purpose of the 'GreaseSpot' is to share ideas and tips on 'two wheel vehicle' maintenance (Bicycle and Motorcycle). Questions, ideas and tips come from our fellow riders, and can be on most any topic of maintenance.

This GreaseSpot discusses several aspects of motorcycle battery care and storage for during the off-season. There are basic two types of battery technologies used for motorcycles: Flooded Wet Cell and the Maintenance Free (usually using AGM or Absorbed Glass Mat medium). Both types are lead-acid based batteries, and can have specific charging requirements. The primary difference between these two technologies is that the Flooded Wet Cell can be serviced by adding water, and the Maintenance Free cannot. Usually, the reason that water (distilled) needs to be added is because it has been 'boiled' off – more on this 'boiling' later.

While the charging characteristics can be different between the Flooded Wet and Maintenance Free battery technologies, there are some basic similarities that affect battery performance and life.

Important similarities:

- 1) Charging under normal conditions begins at 12.8 volts. Abnormal conditions such as charging a fully discharged battery may require higher voltage.
- 2) State of Charge is 100% when: Flooded Wet Cell is at 12.6 volts; Maintenance Free is at 12.8 volts.
Note: voltage measurement is Open Circuit Voltage Condition (no load)
- 3) Battery Self Discharge is a normal situation and occurs more rapidly during warm weather
 - a. When ambient temperature is 80 degrees; self-discharge is approx 1.4% of charge / day
 1. Over 30 days, the battery can discharge approximately 40%
 - b. When ambient temperature is 30 degrees; self-discharge is approx 0.07% of charge / day
 1. Over 30 days, the battery can discharge approximately 2.1%
- 4) Maximum charging voltage is: Flood Wet Cell = 14.1 volts; Maintenance Free = 14.6 volts
 - a. Battery water loss or 'boiling' can begin when charging voltages exceed these voltages for longer than approximately 48 hours.
- 5) The approximate life of the battery should be 8 to 10 years. The leading cause of premature battery failure is completely discharging the battery which can cause damage to the battery. The 2nd leading cause is 'over-charging' the battery which 'dries-out' or boils the battery out.

Anytime a battery is stored for more than 30 days, the following steps should be taken to extend battery life and reliability.

REMEMBER: Before removing your batteries, installing, commissioning new batteries, or performing servicing operations, be sure to follow safety precautions and always WEAR PROPER EYE PROTECTION.

- 1) Charge battery to 100% and keep them above 75% state of charge; check the 'Open Circuit Voltage' every 60 to 90 days depending on your ambient temperature. Recharge if necessary. A discharged battery can freeze and burst at Voltages at 75% state of charge: Flooded Wet Cell is 12.4 volts; Maintenance Free is 12.6 volts.
- 2) Remember: do not overcharge and most Battery Manufacturers do not recommend leaving your battery on a trickle charger connected for longer than 48 hours to prevent 'boiling'.
- 3) Ideally, store batteries in a cool, dry place with temperatures not below 32°F or above 80°F. Typically, batteries will self discharge at faster rates at higher temperatures.

For example: Temperature

Temperature	Self Discharge Rate
100°F	0.003 Specific Gravity per day or 2.5% / day
80°F	0.002 Specific Gravity per day or 1.4% / day
50°F	0.0005 Specific Gravity per day or 0.35% / day
30°F	0.0001 Specific Gravity per day or 0.07% / day

Note: 0.001 Specific Gravity equals .7% of Charge; 1.265 Specific Gravity equals 100% Charge

- 4) If batteries are to remain in the vehicle, disconnect the ground cable of the battery to avoid discharge by parasitic loads such as clocks, etc.
- 5) Clean battery if dirty, and discard the rag used.