

### **Overcharge**

Modern car charging systems allow only a small current to flow into the battery when it is fully charged. If there is a fault in the alternator, however, a much higher current will pass through the battery all the time that the car is running. This current will cause the battery to lose water rapidly, destroying the maintenance free characteristics of the battery, and will also reduce the life of the battery by damaging the positive grids.

### **Deep**

### **Cycling**

Modern charging systems keep the battery in a high state of charge while the car is running under most operating conditions. However, the battery will discharge under abnormal conditions or if the car is allowed to stand with a load on, for example, lights. On modern cars when parked, there is normally a constant drain on the battery caused by such components as the computer, alarm system, clock etc, and this will cause the battery to become discharged. Depending on the vehicle, this can take weeks or months. Vehicle batteries are designed to accept some cycles of discharge and recharge, but are not designed for applications in which there are constant cycles of charge and discharge (deep cycling). Leisure batteries have been designed for these types of application, and have a special construction to enable them to be deep cycled on a continuing basis. Continual deep cycling of vehicles batteries will cause failure as the positive active material will gradually fall to the bottom of the battery, reducing the ability of the plates to store electricity.

A large number of small black/brown particles in the electrolyte are a strong indication that the battery has been deep cycled.

### **Sulphation**

As explained earlier, sulphation is a normal part of the operation of a battery, and occurs whenever a battery is discharged. When the battery is recharged, the sulphation (lead sulphate) is changed back into active material. If battery is left flat for a period of time, this sulphation slowly changes its form into one that cannot be changed back into active material on charging, so, after charge, the battery will not return to give its original performance. If the sulphation is bad enough, the car will not start. This is the problem normally referred to as sulphation.

### **Undercharge**

Undercharge occurs if the battery is not receiving enough charge to return it to a full state-of-charge; this will slowly cause sulphation. This fault can occur if the car is being used only occasionally for short journeys, or for stop-start urban motoring. Undercharge will also occur if the alternator voltage is in the region of 13.6 – 13.8 Volts.

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