Figure 50-1  Batteries are constructed of plates grouped into cells and installed in a plastic case.

Figure 50-2  A grid used in both positive and negative plates.
**FREQUENTLY ASKED QUESTION**

**What Is an SLI Battery?**

Sometimes the term SLI is used to describe a type of battery. SLI means starting, lighting, and ignition, and describes the use of a typical automotive battery. Other types of batteries used in industry are usually batteries designed to be deep cycled and are usually not as suitable for automotive needs.

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**Figure 50-3**

Two groups of plates are combined to form a battery element.

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**Figure 50-4**

A cutaway battery showing the connection of the cells to each other through the partition.
Figure 50-5  Chemical reaction for a lead-acid battery that is fully charged being discharged by the attached electrical load.

Figure 50-6  Chemical reaction for a lead-acid battery that is fully discharged being charged by the attached generator.

FREQUENTLY ASKED QUESTION: Is There an Easy Way to Remember How a Battery Works?

Yes. Think of the sulfuric acid solution in the electrolyte being deposited, then removed from the plates.
- During discharge, the acid ($SO_4$) is leaving the electrolyte and getting onto both plates.
- During charging, the acid ($SO_4$) is being forced from both plates and enters the electrolyte.
As the battery becomes discharged, the specific gravity of the battery acid decreases.

Figure 50-8: Typical battery charge indicator. If the specific gravity is low (battery discharged), the ball hangs away from the reflective prism. When the battery is charged enough, the ball floats and reflects the color of the ball (usually green) back up through the sight glass and the sight glass is dark.

Chart 50-1: A comparison showing the relationship among specific gravity, battery voltage, and state of charge.
FREQUENTLY ASKED QUESTION

What Determines Battery Capacity?
The capacity of any battery is determined by the amount of active plate material in the battery. A battery with a large number of thin plates can produce high current for a short period. If a few thick plates are used, the battery can produce low current for a long period. A trolling motor battery used for fishing must supply a low current for a long period of time. An automotive battery is required to produce a high current for a short period for cranking. Therefore, every battery is designed for a specific application.
This battery has a cranking amperes (CA) rating of 1,000. This means that this battery is capable of cranking an engine for 30 seconds at a temperature of 32°F (0°C) at a minimum of 1.2 volts per cell (7.2 volts for a 12 volt battery).

FREQUENTLY ASKED QUESTION

What Is Deep Cycling?

Deep cycling is almost fully discharging a battery and then completely recharging it. Golf cart batteries are an example of lead-acid batteries that must be designed to be deep cycled. A golf cart must be able to cover two 18-hole rounds of golf and then be fully recharged overnight. Charging is hard on batteries because the internal heat generated can cause plate warpage, so these specially designed batteries use thicker plate grids that resist warpage. Normal automotive batteries are not designed for repeated deep cycling.