Lead Acid Battery Terms and Ratings

- *Ampere-hours* (A·h) is a measure of electrical charge that a battery can deliver. This quantity is one indicator of the total amount of charge that a battery is able to store and deliver at its rated voltage. Its value is the product of the discharge current (in amperes), multiplied by the duration (in hours) for which this discharge current can be sustained by the battery. Generally, this value (or rating) varies widely with the duration of the discharge period (see: Peukert's Law), therefore the value is typically only meaningful when the duration is specified. This rating is rarely stated for automotive batteries, except in Europe where it is required by law. Nominal capacity(A·h) by EN 60095-1 is rated at a fixed discharge current of I/20, within 20 hours until final discharge voltage of 10.5 V at 25 °C is reached.
- *Cranking amperes* (CA), also sometimes referred to as *marine cranking amperes* (MCA), is the amount of current a battery can provide at 32 °F (0 °C). The rating is defined as the number of amperes a lead-acid battery at that temperature can deliver for 30 seconds and maintain at least 1.2 volts per cell (7.2 volts for a 12 volt battery).
- *Cold cranking amperes* (CCA) is the amount of current a battery can provide at 0 °F (−18 °C). The rating is defined as the current a lead-acid battery at that temperature can deliver for 30 seconds and maintain at least 1.2 volts per cell (7.2 volts for a 12-volt battery). It is a more demanding test than those at higher temperatures. This is the most widely used cranking measurement for comparison purposes.
- *Hot cranking amperes* (HCA) is the amount of current a battery can provide at 80 °F (26.7 °C). The rating is defined as the current a lead-acid battery at that temperature can deliver for 30 seconds and maintain at least 1.2 volts per cell (7.2 volts for a 12-volt battery).
- *Reserve capacity minutes* (RCM), also referred to as *reserve capacity* (RC), is a battery's ability to sustain a minimum stated electrical load; it is defined as the time (in minutes) that a lead-acid battery at 80 °F (27 °C) will continuously deliver 25 amperes before its voltage drops below 10.5 volts.
- *Battery Council International group size* (BCI) specifies a battery's physical dimensions, such as length, width, and height. These groups are determined by the Battery Council International organization.[16]
- Peukert's Law states that the capacity available from a battery varies according to how rapidly it is discharged. A battery discharged at high rate will give fewer ampere-hours than one discharged more slowly.
- The hydrometer measures the density, and therefore indirectly the amount of sulfuric acid in the electrolyte. A low reading means that sulfate is bound to the battery plates and that the battery is discharged. Upon recharge of the battery, the sulfate returns to the electrolyte.

Terminal voltage

The open-circuit voltage is measured when the engine is off and no loads are connected. It can be approximately related to the charge of the battery:

Open-circuit voltage		Approximate charge	Relative acid density
12 V	**6 V**		
12.66 V	6.32 V	100%	1.265 g/cm^3
12.35 V	6.22 V	75%	1.225 g/cm^3
12.10 V	6.12 V	50%	1.190 g/cm^3
11.95 V	6.03 V	25%	1.155 g/cm^3
11.70 V	6.00 V	0%	1.120 g/cm^3

Open-circuit voltage is also affected by temperature and the specific gravity of the electrolyte at full charge.

The following is common for a six-cell automotive lead-acid battery at room temperature:

- Quiescent (open-circuit) voltage at full charge: 12.6 V
- Fully discharged: 11.8 V
- Charge with 13.2–14.4 V
- Gassing voltage: 14.4 V
- Continuous-preservation charge with max. 13.2 V
- After full charge the terminal voltage will drop quickly to 13.2 V and then slowly to 12.6 V
- Open-circuit voltage is measured 12 hours after charging to allow surface charge to dissipate and enable a more accurate reading.
- All voltages are at 20 °C (68 °F), and must be adjusted −0.022 V/°C (−0.012 V/°F) for temperature changes (negative temperature coefficient – lower voltage at higher temperature).