

HOW IT IS MADE:

THE LEAD ACID BATTERY - PART 2

CONSTITUENT PARTS OF THE BATTERY

Container: usually made of plastic, it contains a specific concentration of sulphuric acid.

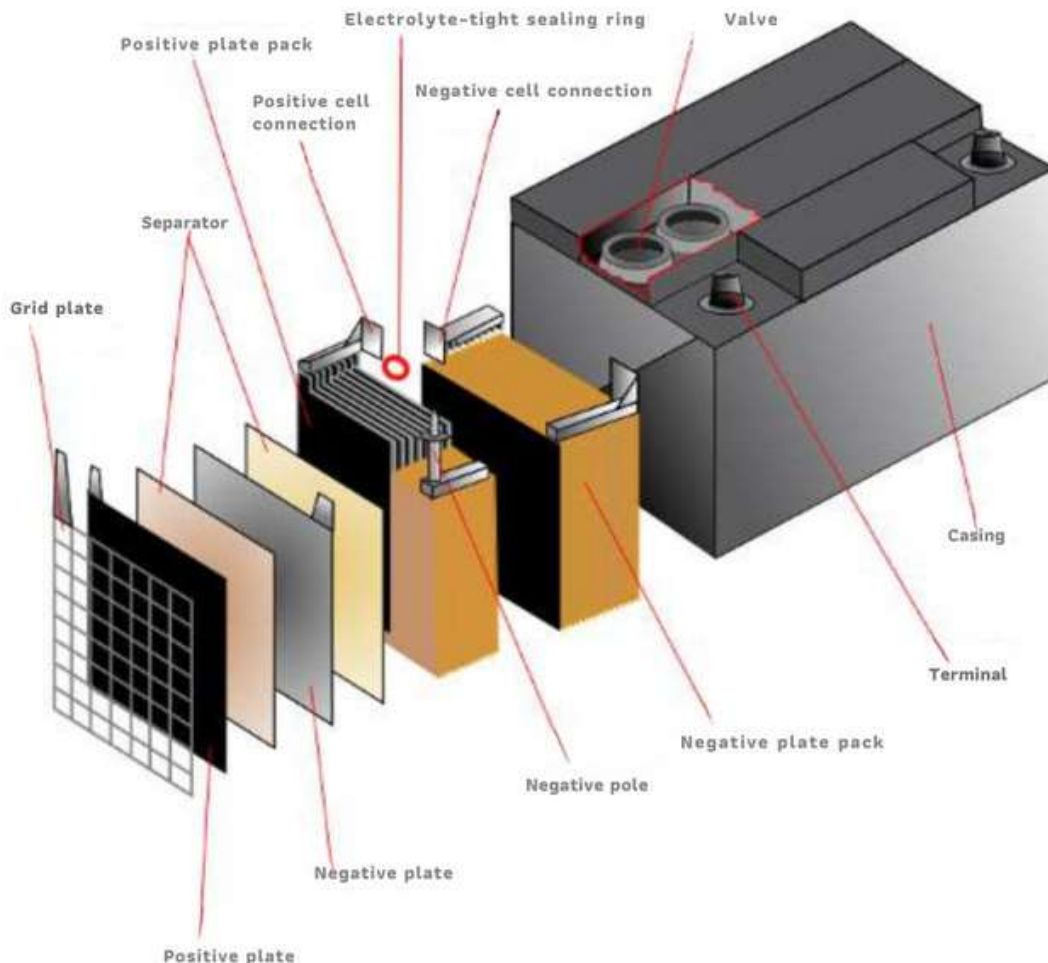
Positive plates: there can be just one single plate, though usually groups of plates electrically connected with each other are considered.

Negative plates: in this case too, there may be multiple plates connected to each other.

Separators: partitioning material that prevents physical contact between plates of opposite sign, without preventing the ionic exchange.

Plates

The plates consist of an internal support (the grid) above which a paste called active material is applied, i.e., the compound that is electrochemically transformed during operation. The grids have a dual function: to mechanically support the active material and to conduct the resulting electrons (delivery phase), which are necessary for the electrochemical reaction (charging phase). The capacity of each individual plate can reach approximately 10 Ah.



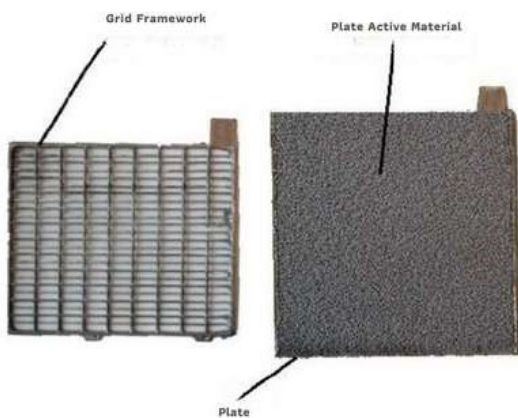


In the case of the lead accumulator, the active materials with a charged battery are:

1. sulphuric acid (density 1.28 kg/l)
2. spongy metallic lead: porous grey mass tending to light blue
3. lead dioxide: brownish-reddish porous mass for positive plates

Grids are usually made of lead alloy and must meet two requirements (as shown in the figure)

1. sufficient mechanical strength to be handled.
2. resistance to the corrosive effect produced by sulphuric acid.

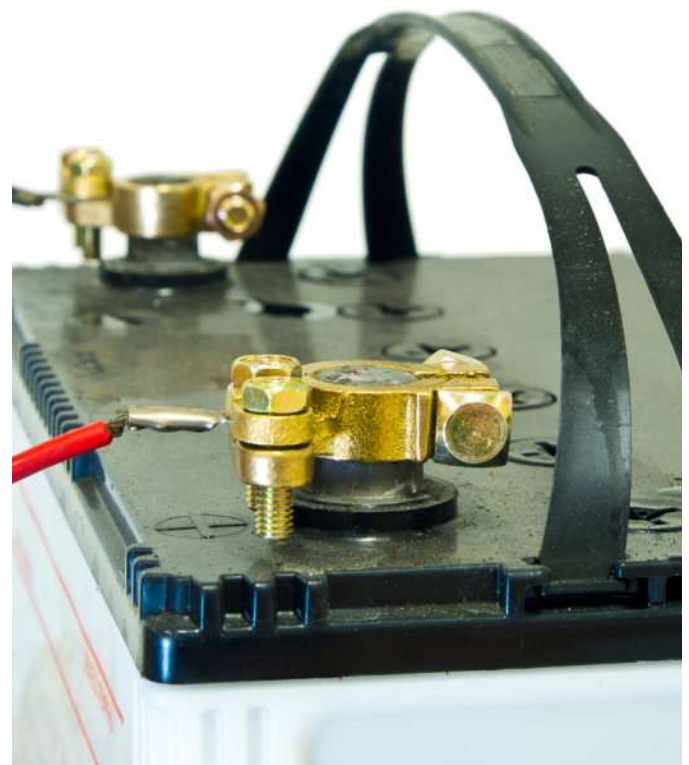
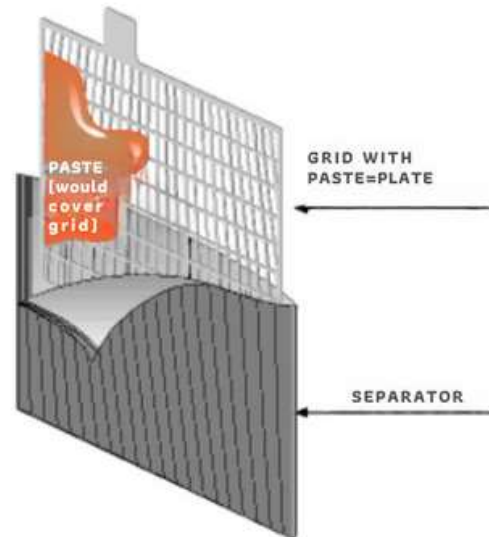


Separators

As explained in the previous paragraph, the plates are immersed in the acid, with an alternation of positive and negative plates. Opposite sign plates cannot be in contact with each other; otherwise, the electric current would pass directly between them without going through the external circuit, causing the so-called short-circuit. As a result, they are divided by separators represented by sheets or (almost always) by envelopes made with strips with the function of wrapping one of the two types of plates, the positive or the negative one.

The material used must have specific characteristics:

1. resistance to sulphuric acid.
2. low resistance to the ionic exchange between the electrodes while still providing physical insulation between them.
3. enough mechanical strength to be handled without tearing.



Reference

Batteries Step by Step: The Lead-Acid Battery
SOVEMA: Equipment for Lead Acid Batteries.