

## Development of expander for Moroccan SLI Lead-acid battery

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Today, several lead acid battery technologies exist, such as valve regulated lead acid battery "VRLA" otherwise called maintenance-free battery, and the absorbent glass matt battery "AGM" with glass fibers, used for to immobilize the electrolyte. Whatever the technology, hard sulfation is one of the most important failure that touches the negative plate. Sulfation is a chemical process irreversible that leads to the formation of non-conductive lead sulphate ( $PbSO_4$ ) called hard sulfate, which leads to the passivation for electrochemical activity of negative plate. As a result, sulfation becomes the most discussed failure mode in lead-acid batteries [1]. To remedy this inconvenience in the negative paste, the expander is added to prevent the deposition of a continuous lead sulfate passivating layer during battery discharge [2].

Expanders are an essential component of the negative plate of lead-acid batteries. Without them the capacity and life would be significantly impaired [3]. This study aims at the development of an expander for the Moroccan manufacturer of battery ELECTRA BATTERIE. In addition, it is dedicated to the various experimental tests and characterizations regarding expander, which offers to the lead-acid battery the better results in terms of load acceptance, load capacity, and the number of charge-discharge cycles, which would automatically extend the life of the battery.

For each development, we produced 1.5 Kg of expander and subsequently we proceeded to the determination of these characteristics; particularly the density, the solubility, the rate of ash, thermal resistance and the particle size distribution. Electrical tests were carried out at Afrique Cable Company to evaluate the performance of the expander. Several tests with different batteries were made including the effective capacity, the cold cranking amps 'CCA' and the electric voltage drop after 10 seconds of discharge, and all this according to the standards.

### References :

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