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Additive puts new life in lead acid

Tony Ferreira of Hollingsworth and Vose describes the science and performance of a new paste additive.

The evolution of lead acid battery technology has been driven by the introduction of new materials and new manufacturing processes and machinery.

The awareness that purity played such a key role in the performance of the battery directed the early battery technicians to specify ever-purer raw materials. This trend has culminated in the ultra pure requirements for the manufacture of today's highly performing stationary batteries (Ref.1).

In tandem with the trend for increasing raw material purity, there were great efforts to make more efficient electrodes, elements and other battery components. The move towards improved battery components was paralleled with ever improving manufacturing technologies.

Another major strategy used by battery technologists to obtain better battery performance and also to improve the process of making these devices, has been to use appropriate additives, particularly active material additives.

The role of these additives has been reviewed and it is generally accepted that modern batteries could not function effectively without their extensive use. (Ref.2).

In this article we shall introduce a new material additive and briefly review its impact on the battery making process, as well as highlight some key performance advantages.

This new inorganic additive has a noticeable impact on key processes of battery making, namely the mixing of the pastes that make up the electrode and also the process of making the battery plates. The impact on these process steps is largely due to the very hydrophilic nature of the new active material additive.

The surface chemical composition of the inorganic active material additive, as well as its geometry and interaction with the surrounding active material structures, help us understand its impact on battery performance. This impact is mostly seen on the better charge acceptance and high rate discharge characteristics of the battery.

The impact is universal and it cuts across manufacturing technologies and battery designs. The use of this new inorganic additive holds much promise for the next round of battery development.

Table 1: Description of NewInorganic Active Material Additive

Chemical Composition:	**Borosilicate Chemical Grade Glass**
Surface Area:	>0.3 m^2/g
Density:	2.4 to 2.6 g/cc
Average Diameter Range:	0.25 to 10 microns
Length to Diameter Ratio:	>5:1
Addition Level:	1% to 3% of Oxide Weight

DESCRIPTION AND USAGE

The new additive is a modified glass microfiber, that is designed and manufactured exclusively for lead acid battery applications.

The major characteristics of this new active material additive are summarized in Table 1. It is available in industrial quantities and is shipped in pre-weighed plastic bags. It can be added directly to a paste mixer in much the same manner that expanders are added in most lead acid battery manufacturing plants. Normal precautions are