

## Company profile: Hammond Expanders

# Mixing it up

Hammond Expanders produces a range of negative plate expander mix to suit just about every battery available. Batteries International learns about its latest R&D projects, including the ALABC contract, and discovers how the company has positioned itself strategically to sell its products into the global market

**T**he industry is divided on this issue: battery manufacturers either use a pre-blend mix or they don't. Hammond Expanders believe there is a growing trend in the industry towards using a pre-mixed expander product. Consultant Dave Boden, who acts as technical director to Hammond, believes a pre-blended mix allows manufacturers to get a ready-made, proven product in a bag at exactly the right size for their paste mix, eliminating administration and labour costs on purchasing, storing and mixing the materials to make the paste.

Hammond has a product "for every type of battery and every kind of environmental situation the battery may operate in" according to vice president Carlos Barreneche.

Barreneche adds that the company also manufactures custom expander mixes for those battery companies who have a specific formula which they want to continue using. He agrees it would be better to streamline the number of mixes, and have fewer formulations, although he admits there is a wide range of battery types to cater for.

### RESEARCH INTO A "SUPER EXPANDER"

But Hammond Expanders doesn't just churn out pre-blended mixes for its clients. In terms of negative plate expander products, it has two key R&D focuses at the moment.

Over the last couple of years, Hammond has been involved in a project with the ALABC to improve the performance of the negative plate in HEVs. In many cases, negative plates in batteries for HEVs have tended to fail prematurely, meaning that the lead acid battery doesn't offer sufficient life and so NiMH batteries are used instead.

Hammond was contracted by the ALABC to conduct research into this problem and Boden says the company has been successful in determining a way of using higher levels of carbon and graphite in the negative plates. He claims



Carlos Barreneche



Dave Boden

Hammond's research has significantly retarded the deterioration of the negative plate, giving the possibility of a vastly extended battery life compared with conventional batteries.

Hammond has developed a test version of what may become a "super expander". As well as containing lignosulphonate and barium sulphate, it has "some carefully crafted mixtures of carbon black and graphite". Boden won't give too much away while Hammond is awaiting confirmation of its patent applications, but says that tests have shown that the new materials can greatly improve cycle life.

"We have results that show around 25,000 cycles with a conventional negative plate expander can be increased to about 100,000 cycles with this new negative plate expander. Up to this point this has all been done on research basis, but we're now starting to transition the project from a research-based product to a development project and to making and testing batteries to see if we can reproduce these excellent research results on a wider scale," says Boden.

There will be an intermediary process where batteries will be constructed on a small scale and subjected to intensive tests to ensure the same results can be achieved outside the laboratory, before the product is put on to the production line.

Hammond admits that the use of more advanced materials may translate to a more expensive final product, but is confident that the benefit of the improved battery performance should justify the increased manufacturing costs.

"This technology offers the potential to greatly enhance the performance of lead acid batteries, but we are still two years of thorough testing away from a completed manufactured product. Pat Moseley of the ALABC is looking at doing simulation programs with automobile manufacturers to see if this technology can be translated to car batteries," says Boden.

Another project addresses the issue of battery failure in higher temperatures. It's well known that batteries operating



Ball mills

Packing lines

Research laboratory

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in hotter climates do not last as long as those in cooler temperatures. In addition, with the increasing amount of onboard electronics under car hoods, the space for car batteries is shrinking, and so car batteries are operating in hotter temperatures, which increases the rate of battery degradation, where grid corrosion occurs at a faster rate and paste cohesion is less and less effective.

"Our development work with the negative plate is to develop a super expander that will handle these high temperatures without degradation. Along with that, in conjunction with Borregaard Lignotech, we have developed a new lignosulphonate. This is more resistant to degradation at high temperature than the normal lignosulphonate. We have done a series of studies, including one with a large battery manufacturer, who has actually produced commercial batteries with the new lignosulphonate that has shown a very significant improvement in battery life."

Boden also explains that if the battery is less resistant to degradation at high temperatures, when batteries are charged during the manufacturing operation, they can actually be charged faster and with better formation throughput without degrading the properties of the batteries.

### MARKET STRATEGY

But Hammond Expanders now claims that it has made enough progress through research to allow it to be one of the leading companies in the development of negative expander formulations for lead-acid batteries. It identifies rival companies as the in-house manufacturing departments of battery companies, as some battery companies still add the individual components of expander directly into the paste mix.

In what may be seen as a drive to encourage the use of an established, standardised product, Hammond says the benefits of a clean, disposable, custom weighed package of expander that has been quality approved, is preferable to the less controlled approach of adding individual expander components directly into the paste mix.

The company sells its paste mix products direct to North America, Europe and large multinational companies, and Sorfin Yoshimura represents it in the rest of the world. The relationship with Sorfin Yoshimura was developed for mutual benefit: Sorfin wanted to sell expander product in the more countries in which it was accustomed to do business, and Hammond needed a representative that had knowledge of the different regions to gain market penetration.

Sales for outside Europe are free on board Hammond Plant, where the Hammond Group distribution company, Total Transportation, assists customers in getting the best rates and services. All European sales are delivered directly to the customer per carriage paid to terms.

Sorfin Yoshimura is an agent for marketing and distribution of Hammond products, although Hammond deals with all North American and European marketing in-house. Hammond's busiest period is usually during the second quarter, when sales of its automotive expander increase after a slow down in the winter months.

Among the factors currently affecting the marketing and distribution side of the business, the declining value of the dollar

is increasing costs across the board due to exchange rate favouring the euro. The rising prices of raw materials is another sticking point - the rising cost of oil has resulted in increased raw material prices for one of carbon black, one of the ingredients in negative plate expander. In addition, the recent hike in lead prices has lead battery manufacturers to be more cost conscious and more reluctant to accept price increases.

Yet this is a company that has overcome far worse ordeals. It survived a plant fire that totally consumed the production facility, destroying all raw materials and finished product within. In order to manufacture product fulfil orders Hammond overcame this by resuming production from the Hammond Lead Products facility within two days of the fire and shipping out on the third day. Furthermore, the economic slump following the terrorist attacks of September 11 impacted heavily on the market for industrial expanders and the company estimates it lost as much as 50 percent of its sales in the months after.

### IT'S ALL IN THE MIX

So Hammond Expander is company driven by R&D in which it invests a lot of time, money and equipment. In its new state of the art research centre, it can carry out a variety of operations from pasting plates to testing the performance of prototype expanders in formed and charged batteries. Many members of staff are either recent college graduates or current students. However, the company says it also prides itself on the amount of contact it has with end users.

"Because we are a technically driven organisation, we are able to offer considerable technical assistance to our end users," says product manager Tom Haas. "End users have a big influence on our R&D and the production of our products. We want to develop and supply formulations that have a demand, so naturally we need to know what the battery manufacturer desires in a negative expander; we structure our research by working closely with the customer and determining their needs."

Hammond sees the emerging markets of Asia, Eastern Europe and South America as areas of great opportunity. Historically, companies have tended to produce negative plate expander in-house. But Hammond wants to convert them to the virtues of its pre-blended expander product.

"Once manufacturers in these regions discover that they can have a custom weighed and packaged product, which will dispense with inventory issues and overhead costs associated with in-house production, we are convinced they will go with a pre-blended expander product," says Haas.

To this end, Hammond sees the market for pre-blended expanders as one of definite growth potential. Its industry should continue to develop if and when vertically integrated battery companies decide to switch to a pre-blended expander product.

Haas for one is confident that once battery manufacturers look at the total costs involved for in-house expander production and compare it to the total costs of pre-blended expanders, the difference in cost, product reliability and performance will become immediately apparent. And perhaps the division in the industry may then gradually disappear. ■