



WHY DOES
THE DEKA BATTERY
OUTPERFORM THE COMPETITION
IN A RAPID/FAST CHARGE ENVIRONMENT?

A WHITE PAPER FOR PURCHASING, MATERIAL HANDLING & FACILITY ENGINEERS



EAST PENN IS THE ONLY INDUSTRIAL BATTERY MANUFACTURER THAT UTILIZES THE PROCESS OF INDIVIDUAL PLATE FORMATION (IPF®) TO ENSURE QUALITY AND CONSISTENCY.

Why is IPF® so important in a rapid charge application?

IPF® allows East Penn to inspect the finished plate in its rawest form to ensure every individual plate in an ORC battery is properly formed before it reaches your plant floor. An improperly formed plate, will likely never properly form on your plant floor because of the short cycling that takes place in an ORC environment.

What happens if a plate doesn't properly form?

Reduced capacity and reduced amp hour output, along with premature battery failure. The unformed battery plate becomes the weakest link in the chain and then starts to cause premature failure in the other plates inside your battery leading to reduced runtime, over discharge, higher internal resistance, increased heat, premature battery failure & truck electrical problems.

Chemically all the active material on an unformed plate is not completely oxidized, the positive plates become "oxidized" into Lead Dioxide. The negative plates are "reduced" to lead. The "unformed" material becomes sulfated. Additional corrosion will occur in the grid metal and the paste.

What Exactly is Individual Plate Formation IPF® ?

After the grid is cast, active material is applied and the plate is cured, East Penn then alternately places the negative and positive plates in an open tank of 1.05 specific gravity acid and connects the plates together using lead sticks. A controlled current is then applied to the cells while closely monitoring the temperature of the specific gravity around each individual plate. This is the very first charge the plate sees and is how a plate begins the formation process.

Chemically the positive plates become "oxidized" into Lead Dioxide. The negative plates are "reduced" to lead. This is when the plates become "charged" for the first time. Once formation is complete each plate is individually removed from the acid tank and visually inspected looking for signs of improper formation. Visually these signs are white areas of "sulfate" on the plate. Improperly formed plates are then collected and sent to East Penn's on-site smelter for recycling.

Why don't the other battery manufacturers use IPF® ?

Primarily cost, and other manufacturers believe that a plate that doesn't properly form will likely form at the customers location by properly charging and then discharging to 80% depth of discharge. While this is somewhat true in a conventional charging environment, it is NOT the case in rapid or fast charging applications. The short charging process that takes place in ORC or fast charging, and the failure to fully discharge and completely recharge the battery like a conventional application inhibits the plate's ability to properly form.

How do the other battery manufacturers form a plate?

Other manufacturers build the entire cell or even the complete battery, then add 1290 specific gravity acid and then will apply the formation charge. To attempt to control the temperature they often will put the assembled cells or even the assembled battery in a tub of water.

What's wrong with forming plates as an entire cell or as a finished battery?

First, with the cell or battery fully assembled you don't have the ability to individually inspect the finished plate so you have no way of ensuring that the individual plates are properly formed. Second, you are using a higher specific gravity of 1290 rather than 1050 and positive plates form most efficiently at a low specific gravity. The higher the gravity, the longer and more inefficient the process. Lastly, it is important to monitor temperature for both plates as higher temperatures will create "softer" positive pasted plates and the negative plates may have their expander released. Lower temperatures are also an issue as they create a more inefficient or longer forming process. It is important to control temperature in a "balanced" way so as to not "over-form or under-form" each individual plate that will be used for your battery.

How is it that east Penn can use Individual Plate Formation and still be competitive?

East Penn has a competitive cost advantage by having two state of the art, industry leading lead smelters on-site at their manufacturing facility. When East Penn identifies improperly formed plates they can easily send to their smelter and start over. Other manufacturers have to send the defective plates as hazardous waste to an off-site recycling facility that typically is owned by external companies and is therefore very cost prohibitive.

EXPERIENCE

- East Penn/ Energy Products were pioneers in Rapid Charge technology
- Started the development of Rapid Charge Batteries in 1992
- First to receive UL Listing on Fast Charge Design
- First to Implement the Dual Cable Design
- Developed the Vented Tray design

PERFORMANCE

- 35% more product life compared to tested competitor products
- More power under the curve
- The lowest defect rate in the entire motive power battery industry – less than 0.01% of Production
- Over 250 quality control checks to assure premium quality – every time.
- Individual Plate Formation IPF® – the only industrial battery manufacturer that utilizes this process to ensure quality and consistency
- Out of 1,000,000 cells produced less than 100 are defective.

PRODUCT

- Robust Flat Plate Design
- Copper Inserted Post
- Unique Grid Design for Enhanced Performance
- Individually Inspected IPF Technology Plates

