PROTECTED BY

ARMOR ALLOY™

LIGHT-YEARS
BEYOND PURE LEAD

DEKA HRC

Technology for Critical Power

Datacenters need a power source that will not fail. High Rate batteries that support this need are being asked to be relentlessly dependable but also increasingly more economical. The Deka HRC product line is protected by Armor Alloy, and amplified with exclusive Compu-Press and Hydro-formation technologies to best meet high rate critical power needs.

WHAT IS ARMOR ALLOY?

Armor Alloy combines a pure lead grid with a proprietary blend of engineered alloys to maximize strength and durability while protecting conductivity and performance.

Before a battery grid is even created, a decision must be made on the raw materials. Most battery companies use a lead alloy with a concentration of lead close to 99%. Despite the novel buzz words which fill the market like “Pure Lead” or “Thin Plate Pure Lead (TPPL)”, pure lead has been around for a long time, and by itself, is not particularly beneficial to the end-user. A battery with 100% pure lead can impede charge acceptance through the gradual buildup of a passivation layer, affecting the mass-to-grid interface[1,2]. What is most beneficial is an engineered blend of lead and alloys to match the battery’s intended service needs.

Based on industry papers, research, and results, optimized performance in high rate applications occurs with a perfected mixture of pure lead with tin and calcium alloys,[2, 3, 4] not solely with just pure lead. Deka HRC batteries with Armor Alloy Technology uses an engineered alloy formula with high lead purity, specifically tailored to meet the proper high-rate application that improves the mass-to-grid interface’s conductivity. An enhanced mass-to-grid interface allows for greater adhesion and uniformity of active material contact, optimizing the battery’s power delivery and improving life compared to a strictly pure lead/TPPL battery.

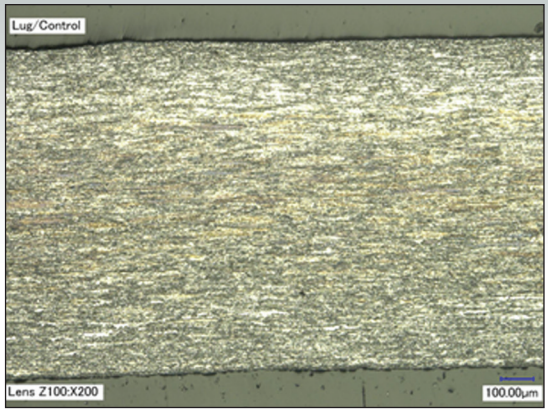
WHAT IS COMPU-PRESS™?

Compu-Press is an exclusive process that produces an optimized battery grid ideal for high rate applications. The core of this proven process is rolling metal to enhance its strength beyond its original state.

Compu-Press casts a thick, continuous solid sheet of engineered alloyed lead, and rolls it under multiple stages of extreme pressure, and compresses that sheet down to a computer-controlled optimally designed thickness. Once compressed, it is ultimately perforated into a highly compacted, robust grid. It is similar to a cold-rolled steel process, which is used for more technically precise applications. In terms of physical characteristics, cold-rolled steels are typically harder and stronger than standard hot-rolled steels. As the metal is shaped at the lower temperatures, the steel’s hardness, resistance against tension breaking, and resistance against deformation is increased[5].

The beneficial effects of high tin on positive-grid corrosion in VRLA batteries improve corrosion resistance because of the large number of fine precipitate particles and better accommodation of the stresses of corrosion by the high mechanical properties of the alloys.[4]

— R. DAVID PRENGAMAN



(Fig. 1)

East Penn's exclusive Compu-Press process, in combination with our engineered alloy formula, produces the highest quality grids, featuring an excellent combination of mechanical properties such as improved tensile strength, shear strength, toughness, and hardness. Compared to pure lead/TPPL, lead alloyed with high tin, and low calcium is over 390% stronger in Ultimate Tensile Strength. This increased strength helps prevent active material shedding.

The Compu-Press process changes the original materials' morphology into a homogenous grain structure, solidifying it for high rate performance rigors. A finished Compu-Press grid creates an elongated grain structure with a visual appearance similar to layers of armor *(Fig. 1)*. The outer layers limit the electrolytes path to the grid's outer surface, protecting the grid's inner layers and core. Should corrosion affect the outer layer, there are multiple layers of protection still in place.

As with any lead battery, corrosion of the grid by the electrolyte occurs along the grain boundary edges. With its horizontal layers of armor, any pathways for the electrolyte to penetrate the Compu-Press grid grain boundary edges are similar to a labyrinth, making it virtually impassable.

WHAT IS HYDRO-FORMATION?

After the grids are created and pasted with our proprietary lead-oxide paste, they become plates. After plates are cured using exacting methods, they are inserted into battery cases, assembled, and are ready for our Hydro-Formation. As a manufacturing process, the formation step is critical to provide the battery energy for long life and performance. As is common practice, the step of formation involves forming out the battery plates with high amounts of electricity, producing large amounts of heat as a byproduct. Formation is also a very carefully calculated process that takes a prescribed amount of time. East Penn uses a highly technical computer-controlled process of chilled water-assisted formation through its proprietary Hydro-Formation process.

Hydro-Formation enables a more consistent and efficient formation of the entire battery by controlling its overall temperature throughout the entire process, resulting in significant productivity efficiencies and energy savings.

WHAT IS THE VALUE EQUATION?

Through these key features, Deka HRC batteries offer peak performance, while leveraging your capital investment. Deka HRC batteries are virtually 100% sustainable and offer a financial credit when they reach end of life. Compared to alternative technologies such as lithium, Deka batteries provide high reliability and the lowest overall Total Cost of Ownership (TCO).

CHOOSE A COMPANY YOU CAN TRUST

With 80 years in the industry, and a known track record of performance, sustainability, and continued capital investment, East Penn makes batteries that work and consistently perform at the top of industry needs. Incorporating our proven Armor Alloy, Compu-Press, and Hydro Formation technologies into our Reserve Power line gives customers with critical power applications, another reason to rely on the Deka name.

SOURCES:

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4– The Impact of ALABC Research Results on Battery Design, The Battery Man, Author: R. David Prengaman, RSR Technologies
5– Hot Rolled vs. Cold Rolled Steel Blog - reliancefoundry.com

EASTPENN

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QUALITY SYSTEM CERTIFIED ISO 9001 IATF 16949 ENVIRONMENTAL SYSTEM CERTIFIED ISO 14001

UL Recognized Component

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