Deka®

°fahrenheit™

HEAT TOLERANT VRLA BATTERIES

Total Cost of Ownership (TCO) Analysis – Deka Fahrenheit compared to Ni-Cd in High Temperature OSP Applications

One of the telecom industries most critical challenges has been battery life at outside plant (OSP) facilities, and how those batteries, specifically lead batteries, are affected by high temperatures directly related to product life. Alternative technologies, promoting tolerance to higher temperatures, have entered the competitive marketplace and challenged the established lead battery industry.

East Penn Manufacturing has spent over five years developing a product through multiple prototypes and Designs of Experiment (DOE) that produced a revolutionary heat tolerant lead-acid battery, the Deka Fahrenheit. The Deka Fahrenheit takes lead battery technology to the next level in high heat applications.

The Deka Fahrenheit battery offers the best TCO for the OSP telecom industry today.

What makes the Deka Fahrenheit special?

Helios™ Additive – Exclusive additive reduces float current up to 75%, enhancing high temperature life

THT™ Plastic – Specifically formulated heat resistant plastic case and cover optimizes compression

Microcat® Catalyst – Lowers float current, mitigates thermal buildup and cell dryout

IPF® Technology – Exclusive process optimizes capacity, cell consistency, and long term reliability

TempX™ Alloy – Optimized positive alloy inhibits corrosion under the highest temperature extremes

These unique features enable the ***Deka Fahrenheit*** to ***last up to 3X longer*** than standard lead VRLA product in 60°C Telcordia life testing and offer a lower TCO than Ni-Cd batteries.

Total Cost of Ownership

When choosing the right product for an application, there are many factors to consider such as life, sustainability, and cost. The Deka Fahrenheit offers the lowest overall TCO in high heat OSP applications.

Life

In today's demanding applications, the Deka Fahrenheit will perform for six years in an average operating environment temperature of 95°F (35°C). Based upon East Penn's industry knowledge and historical observation, the vast majority of Telecom battery containment structures are typically in service between ten and twenty years of age, with the majority closer to the latter. Following this model for an OSP cabinet with an 18 year service life, the Deka Fahrenheit site would require two replacements and the Ni-Cd battery site would require one.

18 YEAR MODEL

48V OSP Solution (1 battery string)

145 AH product	Initial Cost*	Replacement Cost	Replacement Labor**	Recycling Cost***	Recycling Credit†	Total
Ni-Cd (38 Cells)	$4,957	$4,957	$300	$546	$0	**$10,760**
Deka Fahrenheit (4 Batteries)	$1,500	$3,000	$600	$0	-$490 (initial and replacement)	**$4,610**

170 AH product	Initial Cost*	Replacement Cost	Replacement Labor**	Recycling Cost***	Recycling Credit†	Total
Ni-Cd (38 Cells)	$5,794	$5,794	$300	$666	$0	**$12,554**
Deka Fahrenheit (4 Batteries)	$1,637	$3,274	$600	$0	-$562 (initial and replacement)	**$4,949**

200 AH product	Initial Cost*	Replacement Cost	Replacement Labor**	Recycling Cost***	Recycling Credit†	Total
Ni-Cd (38 Cells)	$5,794	$5,794	$300	$666	$0	**$12,554**
Deka Fahrenheit (4 Batteries)	$2,071	$4,142	$600	$0	-$724 (initial and replacement)	**$6,089**

Based on scenarios, the Deka Fahrenheit solution saves end users an average of over $6,700 (57%) when compared to Ni-Cd batteries over an 18 year period.

* - Based on Network Pricing
** - Based on estimated labor of 1.5 hours per replacement
*** - Based on leading independent dealer charges of $1.00/lb.
† - Based on recycling credit of $.30/lb.

Being green means more than saving costs... East Penn is a long-term faithful steward of the environment

Lead Batteries

Recycling:

The lead battery industry is a model of environmental sustainability, and East Penn operates the industry's most advanced, **environmentally safe recycling** facility. Lead batteries are the environmental success story of our time and more than 98 percent of all battery lead is recycled.[2] At East Penn virtually **100%** of each battery is recycled including the lead, plastic and electrolyte.

The lead battery gains its environmental edge from its closed-loop life cycle. When a spent battery is collected, it is sent to a permitted recycler where, under strict environmental regulations, the lead and plastic are reclaimed and sent to a new battery manufacturer. The recycling cycle goes on indefinitely. This makes lead battery disposal extremely successful from both environmental and cost perspectives.[2] As mentioned in the TCO analysis, lead batteries like the **Deka Fahrenheit provide a financial credit to users for recycling.**

Production energy and emissions:

Based on a study by Argonne National Laboratory, lead-acid battery manufacturing boasts the lowest production energy per kg and WH across all major battery technologies, including Ni-Cd. In addition, lead-acid manufacturing also has the **lowest emissions** across all major battery technologies as well.[4]

Ni-Cd Batteries

Recycling:

In contrast, the network for Ni-Cd batteries is extremely limited with only one facility in North America that recycles Ni-Cd batteries.[1] Cadmium reclaimed from the operation is eventually returned to nickel-cadmium battery manufacturers. The nickel and iron become part of the remelt alloy that is used to make stainless steel.[1] The nationwide collection rate for Ni-Cd batteries is 15%.[3] When Ni-Cd batteries are at end of life, the value gained is less than the recycling cost, which is why Ni-Cd battery manufacturers require the customer to pay for disposal.

Production energy and emissions:

Specific to production energy Ni-Cd consumes more than 2X the cradle to gate (mining to shipment) energy per kg and more than 3X the cradle to gate energy per WH compared to lead-acid. In addition, Ni-Cd has 2X the level of CO_2 emissions and significantly higher emissions per kilogram of battery on average pollutant emissions. This includes VOC, CO, NOX, PM, SOX, and is exponentially higher on SOX emissions showing results of 8X higher than lead-acid.[4]

1 – INMETCO website

2 – Battery Council International

3 – Cadmium Recycling in the United States in 2000 by Jozef Plachy – US Department of the Interior. Recycling figure updated in 2010

4 – A Review of Battery Life-Cycle Analysis: State of Knowledge and Critical Needs by J.L. Sullivan and L Gaines – Argonne National Laboratory, October 1, 2010

"The PbA (Lead-acid) batteries also have the lowest CTG (cradle to gate) criteria pollutant emmissions among the batteries."[4]

Choosing a Company YOU CAN TRUST

For almost 70 years, East Penn, operating the largest single-site, lead battery manufacturing facility in the world, has been perfecting the Deka battery manufacturing process. Year after year, East Penn invests in this technology to continue to produce the highest quality products the Deka reputation demands. Deka batteries use the finest materials, workmanship, and most stringent process controls ensuring dependable products…products that are manufactured with the highest quality and have one of the lowest defect rates in the entire Reserve Power industry.

Deka batteries have always and will always be "built to last", providing the performance and dependability demanded by its customers. By choosing a Deka battery, you're getting a great product backed by a company that you can trust.

Deka delivers:

- **Lowest operating costs & Total Cost of Ownership**
  Deka products are built for the long term – *period!*
- **Superior quality products**
  Superior battery quality teamed with a workforce whose number one goal is complete customer satisfaction.
- **Environmental excellence**
  The industry's most advanced, environmentally safe facility handles all your recycling needs.

Beat the Heat

Reduce Expensive Cooling System's Costs

Lasts 3X Longer than Standard VRLA at 60°C

EastPenn

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