The Story of "Pure Lead"

Fact, fiction, or fairy tale fable?



Stories of "pure lead" claims have influenced the way we talk about batteries in the Reserve Power industry. This raises many questions about the true benefits of having pure lead in your batteries and what that actually means. The more intriguing question might be, "Is it really exclusive to those that claim it, and a one-size-fits-all solution for every application?" The following questions have been constructed to examine some facts around "pure lead" and if this marketed feature is genuinely unique.

Q1. Is it good to have 100% pure lead for your battery's grids?

A1. Any supporting structure such as a grid made exclusively of 100% lead would be extremely malleable and soft. While batteries used in float applications are stationary, the internal environment is quite the opposite. Chemical reactions cause the inner-workings to be very dynamic with components that expand and electrons that flow. This is no environment for soft, non-fortified components.

Once batteries discharge their energy they must be recharged. The rate of receiving that charge is referred to as charge acceptance. A battery with 100% pure lead grids can actually impede charge acceptance through the gradual buildup of a passivation layer affecting the paste mass-to-grid interface[1]. Special alloys help improve charge acceptance and the conductive interface between the paste mass and the grid[2].

Q2. What is the definition of pure?

A2. Unmixed with any other matter[3].

Q3. Is there an industry standard for what constitutes a "pure lead" battery?

A3. No. While there is a Battery Council International Standard for defining elemental lead as pure (99.97%), there is no industry standard or quantifiable definition for what is marketed as a "pure lead" battery. Using pure elemental lead is not unique as the majority of high quality battery manufacturers all use it in the manufacturing process. East Penn uses pure elemental lead (99.99%) in both its grids and active material oxide. Our difference, however, is how we alloy that pure elemental lead to give you maximum performance and life.

Q4. Is having high levels of lead in battery grid alloys really unique?

A4. Again, the answer is no. Most battery companies use a lead alloy in which the concentration of lead is close to 99%. So, what makes grids unique? It's the way that these alloys are used with the lead to provide certain benefits to the grid

and enhance battery performance. (As opposed to having a "one-size-fits-all" indiscriminate solution called "pure lead", which is really no solution at all.) Matching the right alloy blend with the unique needs of the battery is not only a solution but a highly effective strategy. East Penn utilizes an Engineered Alloy formula to match the intended service needs of the battery. Greater cycling needs or higher temperature conditions significantly benefit from our strategic alloy enhancements. These enhancements also help reinforce the integrity, durability, and power conductance capabilities of the grid pre- and post-production. For instance, stainless steel is an example of another improved product created from the right alloy formula. Made of iron, carbon, and chromium, it's stronger than any of its original components.

Q5. Do "pure lead" batteries that claim to have "pure lead" also have lower float currents to help withstand internal corrosion?

A5. No, tests have shown that "pure lead" battery float currents have been higher than both East Penn's standard VRLA and Deka Fahrenheit[5].

Q6. What does East Penn do or NOT do that is superior to claims of "pure lead?"

A6. East Penn DOES NOT provide a "one-size-fits-all" solution for energy storage. East Penn DOES engineer Reserve Power grid alloy formulas with high lead purity, specifically tailored to match their proper application, and improve the conductivity of the paste mass-to-grid interface. An enhanced mass-to-grid interface optimizes the battery's power delivery and improves life. East Penn's Engineered Alloy Formula DOES provide grids with corrosive tolerance, conductive performance, manufactured integrity and proven results that a single "pure lead" solution can't match.

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[1]Pure lead and the tin effect in deep-cycling lead/acid battery applications, Journal of Power Sources, Authors: Robert F. Nelson and David M. Wisdom.

[2]Mechanism of Action of Sn on the Passivation Phenomena in the Lead-Acid Battery Positive Plate, Dipartimento di Scienza dei Materiali e Ingegneria Chimica, Politecnico di Torino, Italy, Authors: M. Maja and N. Penazzi

[3]Merriam-Webster dictionary

[4]The Impact of ALABC Research Results on Battery Design, The Battery Man, Author: R. David Prengaman, RSR Technologies

[5]Deka Fahrenheit vs. Pure Lead in Telecom Applications, East Penn Manufacturing Co., Form #2306

East Penn's Engineered Alloy Formula:

- Provides power, performance, and purity with the combined factors of strength, conductivity, and durability that is superior to non-enhanced pure lead
- Designed to impede corrosion and strategically match application use to extend service life
- Delivers a Paste Mass-to-Grid Interface Optimization Strategy that ensures energy and power performance symmetry for maximum conductive efficiency and longer life

And now that you've read the real story...

Contact East Penn today to learn more about how we can deliver a *happily ever after* for your unique power and service needs.

EAST PENN

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