Smart Carbon™ – Trojan's Answer to Partial State of Charge

Deep-cycle batteries used in off-grid and unstable grid renewable energy (RE), telecom and inverter backup systems are heavily cycled at partial state of charge (PSOC), and are often never fully recharged on a regular basis. Operating at PSOC can quickly diminish the overall life of a battery, which results in frequent, costly battery replacements.

To address the issue of PSOC, Trojan's engineering team has done extensive research on technology and methods to extend the life of our deep-cycle batteries designed for RE, telecom and inverter backup applications. Based on more than five years of R&D, the team has developed Smart Carbon™, a proprietary formula of carbon additives designed to enhance the life and performance of Trojan Industrial and Premium batteries when operating in PSOC. Trojan Battery is the ***first*** manufacturer to include a carbon additive as a standard feature in deep-cycle flooded batteries for renewable energy applications.

Partial State of Charge -- Challenges

PSOC is a reality of most off-grid and unstable grid RE systems. Why? Frequently, solar panels used in these applications are undersized, preventing batteries from achieving a full recharge. The same is true with intermittent weather conditions or placement of solar panels in shady areas, which affect a solar installation's ability to collect and store enough energy to fully recharge batteries.

PSOC is also common in inverter backup systems when batteries are not fully charged because the grid frequently goes down. Since the grid is the main charging source for the batteries, the consistent unavailability of the grid prevents deep-cycle batteries from reaching a full charge on a regular basis, resulting in diminished life of the battery.

Telecom applications which operate off-grid, rely on an unstable grid, or depend on a hybrid RE/battery system for power face similar PSOC issues as does solar. The same is true for telecom applications that are powered by diesel generators, which also serve as the main charging sources for a telecom solution's battery backup system. In many diesel generator installations, the system is often set up to purposely not bring the deep-cycle batteries to a full SOC on a daily basis in order to save money on fuel costs, once again resulting in batteries operating in PSOC conditions.

Why Carbon?

Trojan's engineering team has been experimenting with many types of carbon in various formulas for more than five years, and developed the Smart Carbon proprietary formula which provides improved performance when a battery operates in PSOC. Smart Carbon helps enhance overall battery life in an application where the batteries are not fully recharged on a regular basis.

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Trojan's Carbon Strategy

While most carbon additive research has focused on VRLA batteries for start-stop automotive applications, Trojan's focus is on the addition of carbon to deep-cycle flooded batteries for stationary applications. Deep-cycle flooded batteries are still the most widely used battery technology in RE, telecom and inverter backup applications due to their widespread availability and more economical price point. For these reasons, Trojan plans to make Smart Carbon a standard carbon additive to its current deep-cycle flooded technology.

Availability

Trojan Industrial and Premium batteries featuring Smart Carbon are now available. Customers can contact their local distributor or dealer for pricing information.

Other Expert Research

The industry's leading market and technology research firms have also conducted independent research on the use of carbon in lead acid batteries, and have found that the use of carbon on a battery's negative plates dramatically reduces sulfation at PSOC which is the leading cause of shortened cycle life of lead acid batteries.

Advanced Lead Acid Battery Consortium (ALABC)

ALABC, an international research cooperative organized to enhance the performance of lead-acid batteries for a variety of markets, has released findings from its member battery industry companies stating that "lead carbon batteries provide better performance in partial state-of-charge operations, making them optimal for applications requiring high-rate and recharge."
Read more at: *http://www.alabc.org/publications/vrlas-in-stationary-energy-storage*

Battery Council International (BCI)

BCI, a trade association representing industry-leading battery manufacturing companies, has also released findings from its member companies stating that "Newly developed carbon-based advanced lead acid technogy has the ability to provide high energy efficiency and absorb charge rapidly, making it ideal for applications that operate at a partial state of charge. Advanced lead acid batteries will support these applications at ⅓ of the cost of nickel cadmium and ¼ of the cost of lithium ion batteries."
Read more at: *http://c.ymcdn.com/sites/batterycouncil.org/resource/resmgr/Brochures/BCI_HEV_7-10-2012.pdf?hhSearchTerms=%22carbon%22*

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