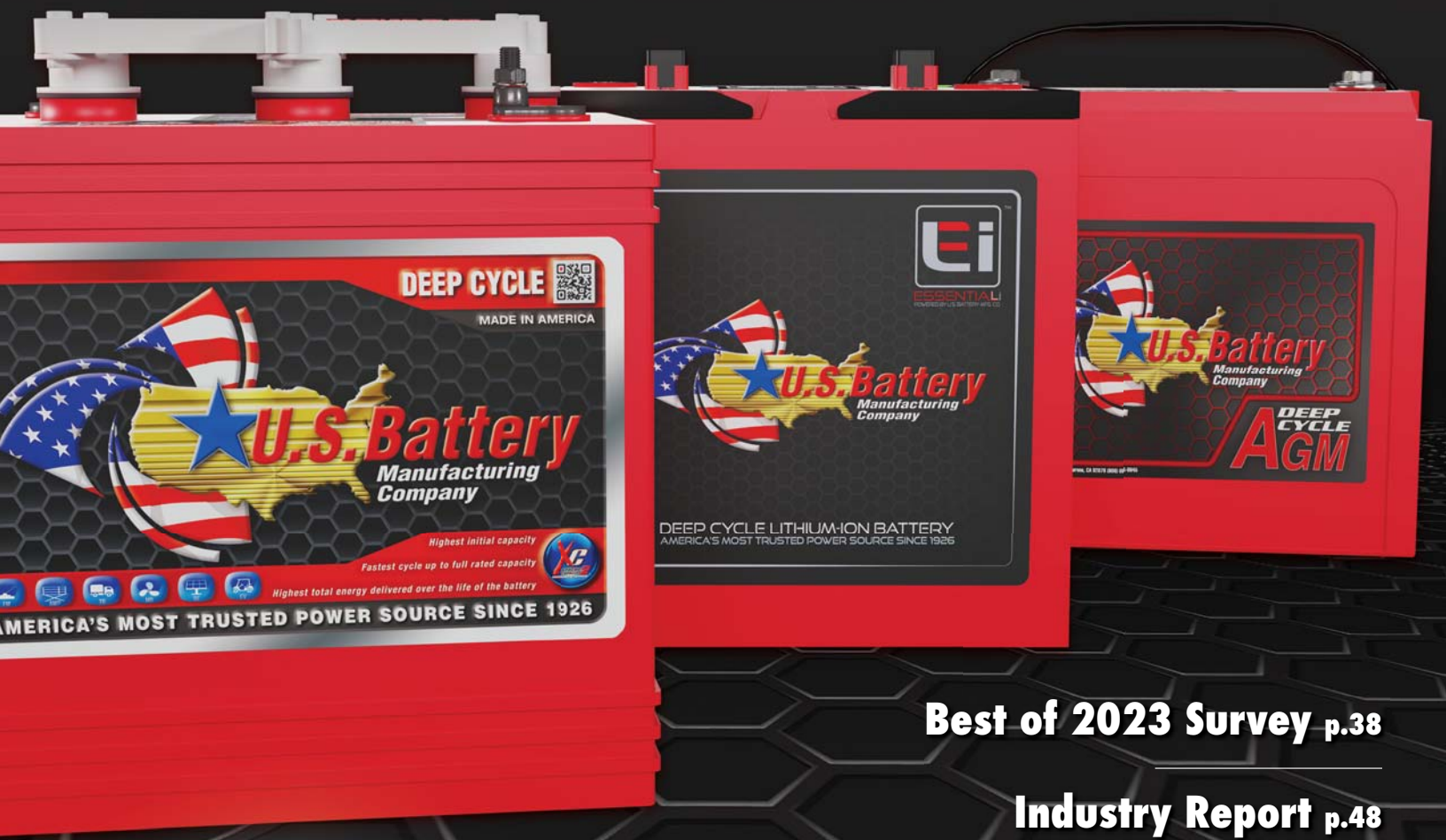
GOLF CAR ADVISOR

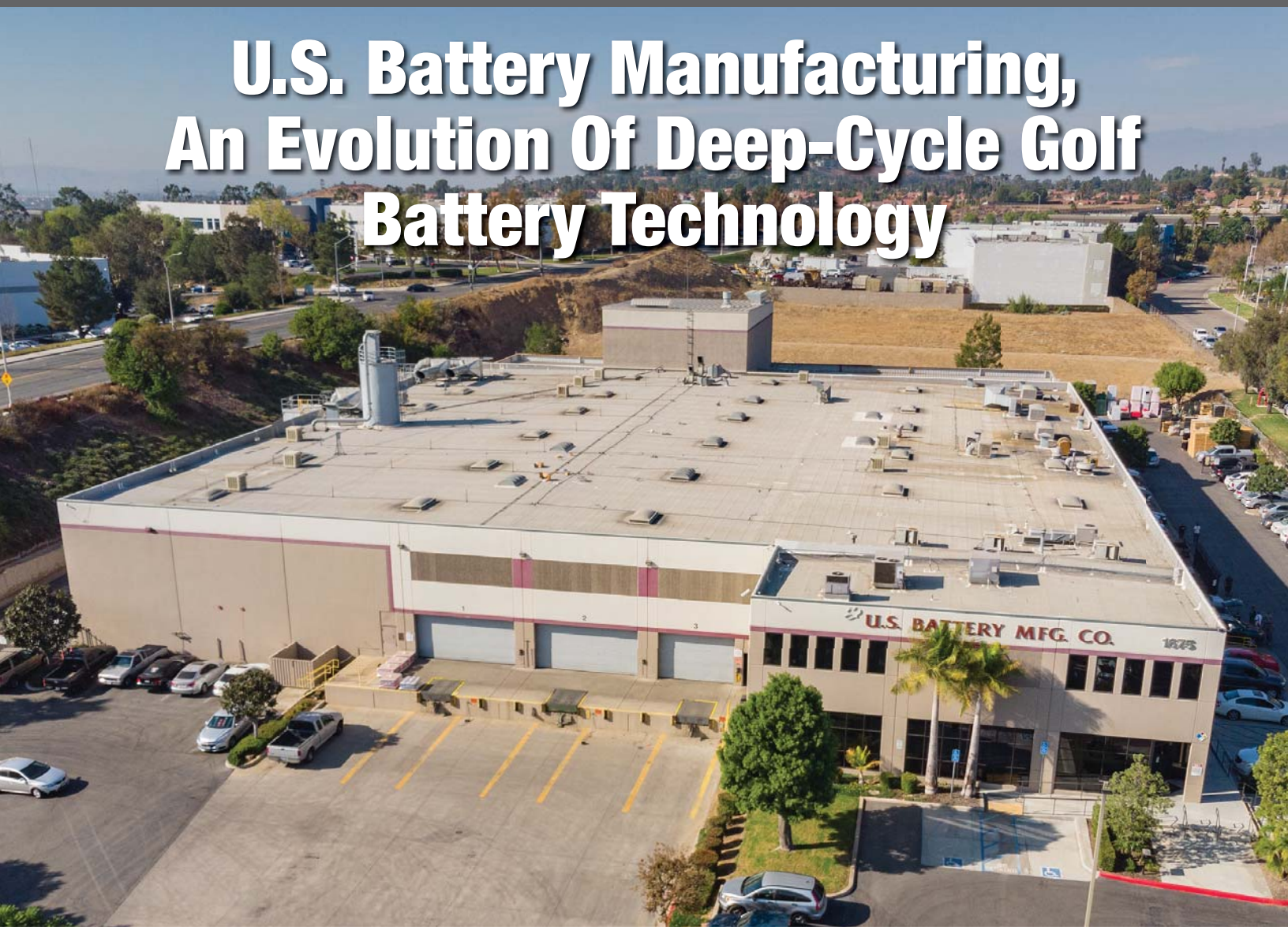
The premier trade publication for the Golf Car/LSV Industry

SEPTEMBER/OCTOBER 2023



COVER STORY

U.S. Battery Manufacturing, An Evolution Of Deep-Cycle Golf Battery Technology



U.S. Battery Mfg. Co. Corporate Headquarters in Corona, CA

With 97 years of expertise, U.S. Battery Mfg. Co. stands as a prominent and forward-thinking battery manufacturer, one that is committed to enhancing the performance, durability, and efficiency of its deep-cycle batteries across various applications to meet the changing demands of modern equipment.

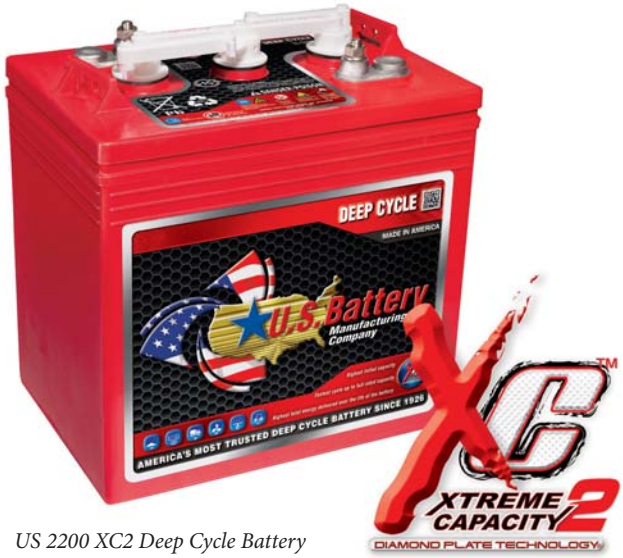
Over the years, significant advancements in battery technology have made golf car batteries more affordable and dependable. U.S. Battery's innovative solutions provide customers with a wide range of options to suit their budget and vehicle requirements. No matter the make and model of golf car, owners can expect increased runtimes and enhanced reliability, ensuring every outing is an exciting golfing experience.

Advances in Flooded Lead Acid Batteries

The most popular among golf car owners is the Flooded Lead Acid (FLA) battery. U.S. Battery found ways to increase the efficiency of the grid alloys within these batteries. Historically, during cycling, the positive grids would slowly corrode, and grid corrosion was found to be a primary failure mode. This would eventually deliver reduced runtime in golf cars and a loss of power altogether.

U.S. Battery improved corrosion resistance by adding selenium to the antimony of the grid alloys. The addition of selenium acts as a grain refiner to produce a fine-grain alloy that increases its strength and electrical conductivity. The effect of this improvement is that positive grid corrosion is no longer a primary failure mode, and the cycle life of Flooded Lead-Acid (FLA) deep-cycle batteries has been significantly increased.

The active materials pasted on the grids in a battery's positive electrodes have also been improved over the years. The active materials start as basic lead sulfates, while tetrabasic lead sulfate (TTBLS) provide the longest cycle life. Historically, TTBLS crystals have been 'grown' in a process called hydroset. Because growing crystals depends on many factors such as time, temperature, humidity, etc., the sizes of the finished TTBLS crystals can be



US 2200 XC2 Deep Cycle Battery

unpredictable. U.S. Battery has found that through the use of crystal seeding additives, the size and distribution of these crystals can be controlled to produce consistently small crystals distributed uniformly throughout the electrode.

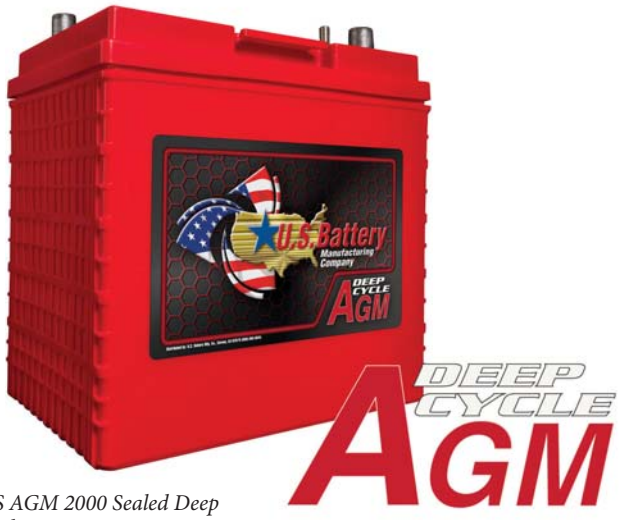
These consistently sized crystals deliver golf car customers batteries with increased initial battery capacity, faster cycle-up to the full rated capacity, higher peak capacity, and improved charging using the wide range of charger technologies.

Absorbed Glass Mat (AGM) Battery Improvements

As FLA deep-cycle batteries developed, golf car customers sought maintenance-free batteries. U.S. Battery introduced its Absorbed Glass Matt (AGM) batteries as a high-performance, maintenance-free battery to fill that need.

U.S. Battery's updated AGM deep-cycle battery uses thicker positive alloy grids for exceptional corrosion resistance, high-density positive active material, and advanced glass mat separators. These components work together to maintain the battery cell structure during deep cycling and limit acid stratification that can occur if batteries sit for long periods.

AGM batteries from U.S. Battery also feature a carbon-enhanced negative active material that improves charge acceptance and cycling performance. In addition to being fully sealed and maintenance-free, U.S. Battery's AGM designs improve reliability, overall performance, and deliver longer cycle life for golf car owners to enjoy their vehicles longer.

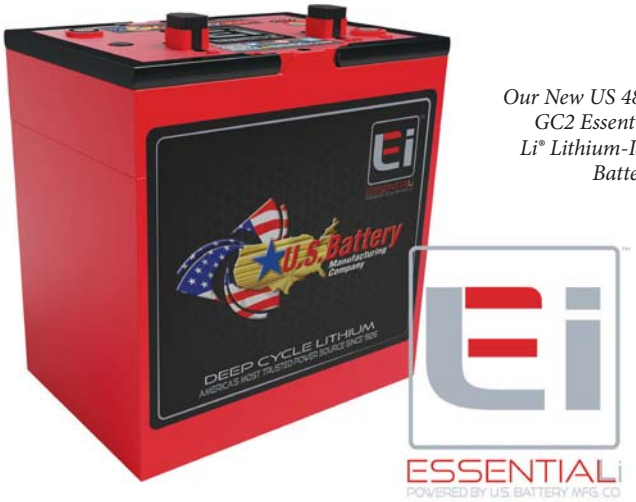


US AGM 2000 Sealed Deep Cycle Battery

Lithium-Ion Technology

As the needs of the golf car customer and industry have evolved, U.S. Battery developed the latest in lithium-ion power and performance. U.S. Battery's ESSENTIAL Li® batteries are engineered using Lithium Iron Phosphate (LFP) cell chemistry, the safest available. These batteries feature reliable, maintenance-free operation with longer runtimes and increased capacity. ESSENTIAL Li® batteries utilize prismatic cells within a metal case enclosure. These cells deliver proven cycling performance, shorter charging times, and longer runtimes, especially in golf car applications.

ESSENTIAL Li® deep-cycle batteries also have various technological features, including a robust Battery Management System that monitors and optimizes operation. It notifies golf car owners of the battery's status via a LED and has a Wake Button to turn the battery on and off. For golf car rental facilities or golf courses that use smart chargers, 48V and 24V model Essential Li® batteries also feature automotive-grade CAN bus Networking connections and an integrated heat sink to protect the ECU to prevent overheating during charging or discharging.



Our New US 48V GC2 Essential Li® Lithium-Ion Battery

The outer casing of Essential Li® GC2 batteries are IP67 rated, making them waterproof and preventing damage from dust intrusion and moisture from rain or light pressure washing of the vehicles or equipment they power.

U.S. Battery - Complete Golf Car Battery Provider

With its line of FLA, AGM, and Essential Li® line of batteries, U.S. Battery continues to listen to the needs of the golf car industry and create the latest technological advancements in deep-cycle battery products to be a complete golf car battery supplier. The company's history in battery development showcases its long-term commitment to improving battery power while meeting the changing needs of the industry as well as the latest equipment to provide optimum and reliable battery power into the future. For more information on any of U.S. Battery products and to find a local dealer, visit www.usbattery.com.