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Lead is getting lighter
- **Safety and Reliability**  
Lead – A longer track record in safety and reliability than other rechargeable battery technologies
- **Sustainability/Recycling**  
Lead – One of the highest recycling rates on the planet

**Informational Sources:**

- <sup>1</sup> ©2011 Battery Council International
- <sup>2</sup> <http://mooni.fccj.org/~ethall/h2so4/h2so4.htm>
- <sup>3</sup> Cannone, A., Cantor, W.P., Feder, D.O. & Stevens, J.P., "The Round Cell: Promises vs Results 30 Years Later", Proceedings of the 26th Annual International Telecommunications Energy Conference, Chicago, IL, September 19-23, 2004

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## Safety and Reliability

Over the years, lead battery technology has demonstrated its safety and reliability and has a longer track record than any other rechargeable battery technology. Its century and a half of dependable use has provided a remarkable record of safety in manufacturing, recycling and distribution.

**Lead batteries have demonstrated the safest and most reliable track record of any power storage solution in use today.**

Over its more than 150 year history, lead battery technology has achieved superior safety and reliability. These characteristics have made it the most commonly used technology in rechargeable batteries, for the widest range of applications.

**Lead batteries have a proven track record of safety in manufacturing, shipping, diverse applications and recycling.**

While the lead battery industry is the world's largest consumer of lead, air emissions of lead from lead battery production are less than 1% of total U.S. lead emissions.<sup>1</sup> Historically, the main sources of human lead exposure have been from leaded paint, leaded gasoline, leaded pottery, lead water pipes, and lead solder – not lead batteries.



**Trust the track record. For over a century and half, lead battery technology has proven its safety and reliability above and beyond any other rechargeable battery technology. There is not another battery chemistry that's more abuse tolerant, dependable, recyclable, available or cost effective than the lead battery.**

Lead battery manufacturing facilities operate in controlled environments with elaborate networks of ventilation and negative air pressure systems to capture any lead particles that might otherwise escape to the outside environment. These particles are captured in fine particle air filters where they are collected and properly recycled. These advanced air safety systems are made possible by the experience gained from many years of manufacturing lead batteries world-wide. In addition, voluntary agreements between lead battery manufacturers and OSHA have systematically reduced worker exposure to lead hazards.<sup>1</sup>

The sulfuric acid used in lead battery electrolyte is the most widely used industrial chemical in the world. As with lead, many innovations have been developed to handle and even completely recycle sulfuric acid battery electrolyte in a safe and environmentally friendly method. Sulfuric acid is non-flammable and is not considered toxic beyond its obvious corrosive hazards.<sup>2</sup>

Innovative recycling facilities have been developed to recycle virtually 100% of a lead battery's components, and industry-supported regulation ensures that these products are returned to appropriate locations for reuse. This applies for the newer advancements in lead technology as well.

Other newer battery technologies can't come close to the recycling advances and developed infrastructure to reclaim the lead battery's components.

The innovative processes for recycling lead batteries and the facilities that support them have progressively advanced over the years to become one of the greatest recycling success stories in the global marketplace.

Along with innovative recycling and environmental practices, shipping of both flooded and sealed lead batteries has been managed safely and efficiently during the long history of lead battery use. Shippers of 'non-spillable' lead batteries are provided exceptions to regulations when proper testing and marking requirements are met, making shipping even more efficient yet just as safe.<sup>1</sup>

Collection, transportation, and handling of spent lead batteries are well defined and regulated by the US government and by most states, often following the model legislation provided by the Battery Council International<sup>1</sup>. Lead battery lead has long been recycled safely with sustained recycling rates above 98%<sup>1</sup>.

**Lead batteries have a proven track record of safe operation in diverse applications.**

Lead batteries safely service diverse applications such as automotive, aviation, marine, medical, nuclear, motive power, standby, uninterruptible power supplies, energy storage, load leveling, renewable energy, security, emergency lighting, electric and hybrid electric vehicles, and many more. Charging and discharging of lead batteries at rates from a few milliamps to many thousands of amps is performed safely on a daily basis. They operate safely and reliably at widely ranging ambient temperatures and in every geographical location, from hot desert conditions to cold arctic environments.

Sealed VRLA battery designs have made the use of lead battery technology even safer. With these non-spillable designs, the chances of acid leaking on to the user or the vehicle are minimal. Also, in the unfortunate event of a car accident, no acid will spill out if the battery is cracked or punctured.

The lead battery chemistry is abuse tolerant, versatile, and a safe, and reliable battery technology.

**Lead batteries are the most commonly used rechargeable batteries.**

The reliability of the lead battery has made it the most commonly used rechargeable battery technology for the widest range of applications. Some have demonstrated calendar lives of up to 30 years in standby applications (e.g. Bell Labs round cell standby battery technology).<sup>3</sup> Their reliability holds true in a wide range of applications that require variable rates and depths of discharge, wide temperature ranges, partial state of charge conditions, high charge rates, and many other fluctuating conditions. Recent innovations in raw materials, battery designs, and manufacturing processes continue to demonstrate the superior reliability of lead battery technology.

