

Lead Acid Battery Safety

You work hard to build and maintain your business. That's why it's important to ensure you're protected from all potential losses – especially when they're avoidable.

In recent years, several large commercial fires occurred as a result of lead acid batteries and chargers. These batteries are commonly found in:

- emergency standby generator sets
- backup power supplies for computers and telecomm systems
- forklifts and other vehicles including cars, trucks, motorcycles, RVs, golf carts and boats

Understanding lead acid batteries

Much has been done to improve the safety and performance of lead acid batteries since their invention.

The basic chemical process to create electricity in the battery hasn't changed over time, but improvements to the materials and manufacturing process have increased their power capacity and energy density significantly.

Batteries incorporate plates of lead alloy immersed in a bath of electrolyte (dilute sulphuric acid) arranged in "cells" to generate 6, 12, or 24 volts. Depending on its application, size and weight, a battery can vary from a small unit you can hold in your hand to a large size that cannot be lifted without mechanical help.

Lead acid batteries also come in a sealed gel electrolyte format or a vented liquid electrolyte format. Both types have venting built in to allow hydrogen gas to escape during charging. These vents are critical to the safe operation of all lead acid batteries.

Did you know?

- The lead acid battery was invented in 1850 by Gaston Plante of France.
- It was the first battery that could be recharged by passing a reverse current through it.
- Lead acid batteries have been the principle means of starting vehicles for almost 100 years.

Lead acid battery hazards

The hazards associated with lead acid batteries are always present during normal operation, but may be more prevalent when charging. Hazards include:

- ✓ fire
- ✓ explosion
- ✓ personal injury (from sprayed acid or lead dust exposure)
- ✓ property damage

These hazards can be made worse if routine housekeeping and maintenance practices are not followed.



Establishing protective measures

When working with batteries, ensure your workplace protection measures meet the health and safety requirements outlined for your province or municipality.

Some of these safety measures may include:

- ✓ installing an eyewash station in the work area
- ✓ ensuring staff wear a facemask and gloves
- ✓ providing proper means to lift and carry heavy batteries
- ✓ maintaining a supply of sodium bicarbonate (baking soda) or sodium carbonate to neutralize electrolyte spills

Your emergency plan should also include detailed information for handling catastrophic battery failures.

Tips for maintaining batteries safely

Use the following tips as a guideline for maintaining batteries and avoiding hazards for your business.

- Disconnect batteries from vehicles when they're not in use for long periods (e.g. winter storage, at the repair shop or in the show room).
- Never leave a charging battery unattended overnight.
- Use battery chargers that incorporate safety features to reduce the potential for dry charging, over-charging or reverse polarity (these are typically microprocessor controlled).
- Ensure battery chargers are in good condition, with no frayed or worn cables, or damaged clamps.
- Close or disconnect the charger immediately and repair or replace it if you see smoke or hear excessive humming.
- Inspect batteries regularly for dirt and grease build up, evidence of corrosion or sulphates on the terminals (dry yellow material), leakage of electrolyte, or any other damage.
- Never charge batteries that were flooded or left underwater, as the hydrogen vents may be blocked with water (check with the manufacturer to determine how to locate and clear the vents).
- Check and clean the battery terminals regularly and ensure connections are tight.
- If the battery is supposed to be "no maintenance" but is unreliable, return it to the supplier for repair or replacement.
- When connecting or disconnecting a battery, ensure there are no live load connections that would cause a spark, and ensure it's completely disconnected from any circuit.
- Be cautious when using tools near a battery – shorting battery terminals with metal tools can cause a catastrophic failure.
- Never attempt to top up the electrolyte in a battery with concentrated sulfuric acid.
- Never try to charge a dry battery or a battery with one or more cells with a low electrolyte level.
- Maintain the area around the charger and batteries and ensure all combustibles are removed from the immediate area (treat the area as if you were working with open flames).
- Install an ABC fire extinguisher close to charging areas.

- Ensure your battery storage area is properly ventilated and equipped with a hydrogen gas detector and alarm system, as well as a fire and smoke detector.
- Replace and maintain batteries according to the suppliers' recommended schedule.

Summary

Understanding the risks of lead acid batteries to your property and taking steps to reduce these risks can save you from having to deal with preventable damage that could cause injuries and impact the profitability of your business.

For further information on this topic, contact your independent insurance broker.

Additional information sources

Health and Safety Ontario: Battery Safety
http://www.healthandsafetyontario.ca/HSO/media/WSPS/Resources/Downloads/BatterySafety_Final.pdf?ext=.pdf

ORR Protection Services: Battery Charging Rooms
<http://info.orrprotection.com/blog/bid/148582/Battery-Charging-Rooms-Gas-Detection-and-Safety>

Grainger: Forklift Battery Changing Station Safety
<http://www.grainger.com/Grainger/static/forklift-battery-changing-station-safety-112.html>

Lead acid battery – Material safety data sheet
<http://www.dekabatteries.com/assets/base/a.pdf>

For further information on this topic, please contact your independent insurance broker.

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