

Hazards of lead acid battery-Emission of harmful gases

Lead acid batteries are the most common large-capacity rechargeable batteries. It is very popular among general consumers because of its high dependability and affordability, which makes it a vital source of electrical power for homes, offices, automobiles, industrial forklifts, electric vehicle, and even a submarines. These batteries are almost 100% recyclable.

Lead acid batteries Hydrogen, Hydrogen Sulphide, Arsenic Hydride and Antimony Hydride gases. Although the levels of Hydrogen, Hydrogen Sulphide, Arsenic Hydride and Antimony Hydride remains well below the occupational exposure limits, they are simply a reminder to provide ample ventilation. Hydrogen is also produced at a very minimal level if battery is charged correctly, but because of its small molecular size, hydrogen can leak from spaces through which other gases cannot pass. Hydrogen is flammable and can become explosive if concentration of the gas in the air is equal or above 4%, which can be mostly achieved if batteries are charged in a sealed room or an area with poor ventilation.

| Physical Properties and Characteristics of Hydrogen | |
|--|--|
| Property/Characteristic | Values (approximate) |
| Color | None |
| Odor | None |
| Toxicity | Nontoxic |
| Density, liquid (boiling point) | 4.4 lb/ft ³ (0.07 g/cm ³) |
| Boiling point (1 atm) | -423.2 F (-252.9° C) |
| Critical temperature (188.2 psia) | -400.4 F (-240.2° C) |
| Stoichiometric mixture in air | 29 vol % |
| Flammability limits in air | 4–75 vol % |
| Detonation limits in air | 18–60 vol % |
| Minimum ignition energy in air | 20 μJ |
| Autoignition temperature | 1,085° F (585° C) |
| Volume expansion: | |
| liquid (-252.9° C) to gas (-252.9° C) | 1:53 |
| gas (from -252.9° C to 20° C) | 1:16 |
| liquid (-252.9° C) to gas (20° C) | 1:848 |

Precautionary measures:

1. Batteries must be used in an area with proper ventilation like balcony or terrace with shade
2. Batteries must not be kept into direct sunlight. No flame, burning cigarette, or other source of ignition should be permitted near the battery storage
3. Regular health check of battery & inverter must be conducted. Battery water level to be kept at recommended level. Inaccurate electrolyte level may create electric spark inside of battery which in turn can cause a massive blast and fire.
4. Avoid overcharging the battery and ensure to regular discharge of the battery if power cut is very minimal and battery power is used very rarely
5. Forced air circulation by use of Exhaust fans is recommended if number of batteries used is high, like in a factory or in an office
6. Use protection gears for safety from chemical exposure
7. Never try to dismantle battery. Never try to short circuit the battery terminals. Battery terminal areas must be kept clean & dry.

Material Safety Datasheet (MSDS) for Lead acid Battery: Fire & Explosion Hazard

| Section 4: Fire & Explosion Hazard Data | |
|---|--|
| Flash point method used | Non Flammable |
| Extinguishing media | Class ABC extinguisher, CO2 |
| Flammable limit for *Hydrogen gas generated during charging | LEL – 4%, HEL – 74% |
| Special firefighting procedures | Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapor in a fire situation are corrosive. Wear special respiratory protection and clothing. |
| Unusual fire and explosion hazards | *Hydrogen gas, which may explode if ignited, is produced by this battery, especially when charging. |
| Use adequate ventilation; avoid open flames, sparks or other sources of ignition. | |

In case of an accident:

1. In case of fire or explosion immediately vacate the area
2. Hydrogen flame is nearly invisible to notice, check the area with a tissue paper on a stick before entering the exposed premises. For larger installations it is recommended to install the Hydrogen sensor/detector as a precautionary measure
3. If a person is injured due to flames or explosion immediately take him to the nearest hospital, fire extinguisher should be used to control the situation only if a person is trained to use a fire extinguisher

LUMINOUS

Disposal of Lead Acid Battery

Heavy metals found in lead acid batteries are toxic to wildlife and can contaminate food and water supplies. Sulphuric acid (electrolyte) spilled from lead acid batteries is corrosive to skin, affects plant survival and leaches metals from other landfilled garbage. Therefore, lead acid batteries are considered as hazardous waste and shall not be placed into regular garbage. Even though the battery components are recyclable, vented lead acid batteries shall not be disposed-off in dustbins/trash-can. Used lead acid battery must be returned to authorized battery dealers / designated collection centers / registered recyclers only



**SAVE EARTH
DO NOT TRASH**

Battery contains **Pb**

Give old Lead Acid Batteries to authorised dealer/
designated collection centre/registered recycler.*

