



MATERIAL SAFETY DATA SHEET (MSDS)

SECTION 1--- PRODUCT AND MANUFACTURER

Product Name: Valve Regulated Lead Acid (VRLA) Batteries

DELTA Battery

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SECTION 2--- HAZARDOUS COMPONENTS

| Components | %Wt. | TLV | LD50 Oral | LC50 Inhalation | LC50 Contact |
|--|-----------|------------------------|---------------|-----------------|--------------|
| Lead (Pb, PbO ₂ , PbSO ₄) | About 70% | 0.050mg/m ³ | < (500) mg/Kg | N/A | N/A |
| Sulfuric Acid | About 20% | 1 mg/m ³ | (2.14) mg/Kg | N/A | N/A |
| Fiberglass Separator | About 5% | N/A | N/A | N/A | N/A |
| Container (ABS or PP) | About 5% | N/A | N/A | N/A | N/A |

SECTION 3--- PHYSICAL DATA

| Components | Density | Melting Point | Solubility (in H ₂ O) | Odor | Appearance |
|-----------------------|-----------------|-----------------------|----------------------------------|---------|------------------------------|
| Lead | 11.34 | 327.4°C | None | None | Silver-Gray Metal |
| Lead Sulfate | 6.2 | 1170°C | 40 mg/l (15°C) | None | White Powder |
| Lead Dioxide | 9.4 | 290°C | None | None | Brown Powder |
| Sulfuric Acid | About 1.3(25°C) | About 114°C (Boiling) | 100% | Acidic | Clear Colorless Liquid |
| Fiberglass Separator | N/A | N/A | Slight | Toxic | White Fibrous Glass Membrane |
| Container (ABS or PP) | N/A | N/A | NONE | No Odor | Solid Plastics |

SECTION 4---PROTECTION

| Exposure | Protection | Comments |
|-------------|------------------------------------|---|
| Skin | Rubber gloves, Apron, Safety shoes | Protective equipment must be worn if battery is cracked or otherwise damaged. |
| Respiratory | Respirator (for lead) | A respirator should be worn during reclaim operations if the TLV exceeded. |
| Eyes | Safety goggles, Face Shield | In the UK use of this material must be assessed under the COSHH regulations. |

SECTION 5--- FIRST AID MEASURES

| | |
|------------------------------------|--|
| Emergency and First Aid Procedures | Contact with internal components if battery is opened/broken. |
| 1. Inhalation | Remove to fresh air and provide medical oxygen/CPR if needed. Obtain medical attention. |
| 2. Eyes | Immediately flush with water for at least 15 minutes, hold eyelids open. Obtain medical attention. |
| 3. Skin | Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention if necessary. |
| 4. Ingestion | Do not induce vomiting. If conscious drink large amounts of water/milk. Obtain medical attention. Never give anything by mouth to an unconscious person. |

SECTION6--- FLAMMABILITY DATA

| Components | Flash Point | Explosive Limits | Comments |
|----------------------|-------------|------------------|---|
| Lead | None | None | |
| Sulfuric Acid | None | None | |
| Hydrogen | 259°C | 4% - 74.2% | Emit hydrogen only if over charged (Voltage>2.4 VPC). To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery. Extinguishing Media: Dry chemical, Foam, CO2 |
| Fiberglass Separator | N/A | N/A | Toxic vapors may be released. In case of fire: wear self-contained breathing apparatus. |
| ABS | None | N/A | Danger: Vapors may cause Flash Fire. Harmful or Fatal if Swallowed. Vapor Harmful. |
| PP | None | N/A | Temperatures over 300 °C (572°F) may release combustible gases. In case of fire: wear positive pressure self-contained breathing apparatus. |

SECTION 7--- REACTIVITY DATA

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|------------------------|--|
| Components | Lead/lead compounds |
| Stability | Stable |
| Incompatibility | Potassium, carbides, sulfides, peroxides, phosphorus, sulfurs. |
| Decomposition Products | Oxides of lead and sulfur. |
| Condition To Avoid | High temperature, Sparks and other sources of ignition. |

| | |
|------------------------|--|
| Components | Sulfuric Acid |
| Stability | Stable at all temperatures |
| Polymerization | Will not polymerize |
| Incompatibility | Reactive metals, strong bases, most organic compounds |
| Decomposition Products | Sulfuric dioxide, trioxide, hydrogen sulfide, hydrogen |
| CONDITIONS TO AVOID | Prohibit smoking, sparks, etc. from battery charging area. Avoid mixing acid with other chemicals. |

SECTION 8---CONTROL MEASURES

1. Store lead/acid batteries with adequate ventilation. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.
2. Do not remove vent caps. Follow shipping and handling instructions that are applicable to the battery type. To avoid damage to terminals and seals, do not double-stack industrial batteries.

STEPS TO TAKE IN CASE OF LEAKS OR SPILLS

If sulfuric acid is spilled from a battery, neutralize the acid with sodium bicarbonate (baking soda), sodium carbon (soda ash), or calcium oxide (lime).

Flush the area with water discard to the sewage systems. Do not allow unneutralized acid into the sewage system.

WASTE DISPOSAL METHOD:

Neutralized acid may be flushed down the sewer. Spent batteries must be treated as hazardous waste and disposed of according to local state, and federal regulations. A copy of this material safety data must be supplied to any scrap dealer or secondary smelter with battery.

ELECTRICAL SAFETY

Due to the battery's low internal resistance and high power density. High levels of short circuit can be developed across the battery terminals. Do not rest tools or cables on the battery. Use insulated tools only.

Follow all installation instruction and diagrams when installing or maintaining battery systems.

SECTION9---HEALTH HAZARD DATA

LEAD: The toxic effects of lead are accumulative and slow to appear. It affects the kidneys, reproductive, and central nervous system.

The symptoms of lead overexposure are anemia, vomiting, headache, stomach pain (lead colic), dizziness, loss of appetite, and muscle and joint pain. Exposure to lead from a battery most often occurs during lead reclaim operations through the breathing or ingestion of lead dusts and fumes.

THIS DATA MUST BE PASSED TO ANY SCRAP OR SMELTER WHEN A BATTERY IS RESOLD.

SULFURIC ACID: Sulfuric acid is a strong corrosive. Contact with acid can cause severe burns on the skin and in the eyes. Ingestion of sulfuric acid will cause GI tract burns. Acid can be release if the battery case is damaged or if the vents are tampered with.

FIBERGLASS SEPARATOR: Fibrous glass is an irritant of the upper respiratory tract, skin and eyes. For exposure up to 10F/CC use MSA Comfort with type H filter. Above 10F/CC up to 50F/CC use Ultra-Twin with type H filter. NTP or OSHA does not consider this product carcinogenic.

SECTION10--- SULFURIC ACID PRECAUTIONS

Stability: Stable Substances to be avoided include water, most common metals, organic materials, strong reducing agents, combustible materials, and bases, oxidizing agents. Reacts violently with water - when diluting concentrated acid, carefully and slowly add acid to water, not the reverse. Reaction with many metals is rapid or violent, and generates hydrogen (flammable, explosion hazard).

INHALATION: Acid mist form formation process may cause respiratory irritation, remove from exposure and apply oxygen if breathing is difficult.

SKIN CONTACT: Acid may cause irritation, burns or ulceration. Flush with plenty of soap and water, remove contaminated clothing, and see physician if contact area is large or if blisters form.

EYE CONTACT: Acid may cause severe irritation, burns, cornea damage and blindness. Call physician immediately and flush with water until physician arrives.

INGESTION: Acid may cause irritation of mouth, throat, esophagus and stomach. Call physician. If patient is conscious, flush mouth with water, have the patient drink milk or sodium bicarbonate solution.

DO NOT GIVE ANYTHING TO AN UNCONSCIOUS PERSON.

SECTION11---TRANSPORTATION REGULATIONS

We hereby certify that all DELTA Rechargeable Sealed Lead Acid batteries conform to the UN2800 classification as "Batteries, wet, Non- Spillable, and electric storage" as a result of passing the Vibration and Pressure Differential Test described in DOT [49 CFR 173.159(d) and IATA/ICAO [Special Provision A67].

DELTA Batteries having met the related conditions are EXEMPT from hazardous goods regulations for the purpose of transportation by DOT, and IATA/ICAO, and therefore are unrestricted for transportation by any means. For all modes of transportation, each battery outer package is labeled "NON-SPILLABLE".