



## 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 <sub>2</sub> , PbSO <sub>4</sub> )	About 70%	0.050mg/m <sup>3</sup>	< (500) mg/Kg	N/A	N/A
Sulfuric Acid	About 20%	1 mg/m <sup>3</sup>	(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 <sub>2</sub> 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

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".