



MATERIAL SAFETY DATA SHEET

Valve Regulated Lead-Acid Rechargeable battery

Date: 01.Jan.2022

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product name: Valve Regulated Lead-Acid Rechargeable battery
Company: LEMANIA ENERGY SA
Address: 390, Rue de Bernex, CH-1233, Geneva, Switzerland.
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SECTION 2: INFORMATION ON INGREDIENTS

Product name: Valve Regulated Lead-Acid Rechargeable battery

| Ingredient | CAS No. | Concentration | Hazardous Label |
|--|---------------------|---------------|-----------------|
| Inorganic Lead/Lead Compounds | 7439-92-1 | ~ 72% | T |
| Sulfuric Acid | 7664-93-9 | ~ 20% | C |
| Fiberglass Separator | 65997-17-3 | ~ 2% | / |
| Container Plastic (ABS or PP or PPE/PS) | 9003-56-9 (ABS) | ~ 5% | / |
| | 9003-07-0 (PP) | | / |
| | 25134-01-4 | | / |
| | 9003-55-8 (PPE/ PS) | | / |
| | 9003-53-6 | | / |

Composition comments: All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 3: HAZARDS IDENTIFICATION

Hazards Identification: The battery has passed the vibration test, pressure differential test and leakage test at 55°C according to Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulation SPECIAL PROVISION 238. It is not restricted to IATA Dangerous Goods Regulation (DGR) 62th according to special provision A67 and is not restricted to IMDG CODE according to special provision 238.

Emergency Overview: The internal battery materials may cause severe irritation to eyes and skin. Causes burns.



SECTION 4: FIRST-AID MEASURES

Skin Exposure: If the internal battery materials of an opened battery cell come into contact with the skin, immediately flush with plenty of water for at least 15 minutes. Seek immediate medical attention.

Eye Exposure: In case of contact the electrolyte contained inside the battery with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Seek immediate medical attention.

Inhalation Exposure: If potential for exposure to mist or dusts occurs, remove immediately to fresh air and seek medical attention.

Oral Exposure: If swallowed, do not induce vomiting. Seek immediate medical attention.

Most important symptoms/effects, acute and delayed: Under normal conditions of processing and use, exposure to the chemical constituents in this product is unlikely. The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

Indication of immediate medical attention and special treatment needed: Treat symptomatically.

General information: Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

SECTION 5: FIRE FIGHTING MEASURES

Extinguishing Media: Suitable: Dry chemical, Sandy soil, Carbon dioxide or appropriate foam.

Unsuitable extinguishing media: In the event that a battery is ruptured and the internal components are exposed, DO NOT USE WATER. Do not use carbon dioxide directly on cells.

Specific hazards arising from the chemical: Batteries evolve flammable hydrogen gas during charging and may increase fire risk. Containers may explode when heated.

Firefighting:

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific hazards: Emit toxic fumes under fire conditions.

General fire hazards: Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of corrosive and flammable materials.

SECTION 6: ACCIDENTAL RELEASE MEASURES

If batteries show signs of leaking, avoid skin or eyes contact with the material leaking from the battery. Use chemical resistant rubber gloves and non-flammable absorbent materials for clean up. Mix with inert material (e.g. dry sand, vermiculite) and transfer to sealed container for disposal.

SECTION 7: HANDLING AND STORAGE

Handling:

Keep away from ignition sources, heat and flame. Such batteries must be packed in inner packages in such a manner as to effectively prevent short circuits and to prevent movement which could lead to short circuits. Avoid mechanical or electrical abuse and overcharge. More than a momentary short circuit will generally reduce the battery service life. Avoid reversing battery polarity within the battery assembly.



In case of a battery unintentionally be crushed, acid resistant gloves must be used to handle all battery components. Avoid contact with eyes, skin. Avoid inhalation. No smoking at working site. Materials to Avoid: Strong oxidant, Combustible materials and Corrosives

Storage:

Store in a cool; well-ventilated area. Keep away from ignition sources, heat and flame. Such batteries must be packed in inner packages in such a manner as to effectively prevent short circuits and to prevent movement which could lead to short circuits. Materials to Avoid: Strong oxidant, Combustible materials and Corrosives.

SECTION 8: EXPOSURE CONTROL/PPE

Occupational exposure limits:

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053).

| Components | Type | Value |
|---|------|------------------------|
| Lead and lead compounds (CAS 7439-92-1) | TWA | 0.05 mg/m ³ |

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

| Components | Type | Value |
|--------------------------------|------|---------------------|
| Sulphuric acid (CAS 7664-93-9) | PEL | 1 mg/m ³ |

US. ACGIH Threshold Limit Values

| Components | Type | Value | Form |
|---|------|------------------------|--------------------|
| Lead and lead compounds (CAS 7439-92-1) | TWA | 0.05 mg/m ³ | |
| Sulphuric acid (CAS 7664-93-9) | TWA | 0.2 mg/m ³ | Thoracic fraction. |

US. NIOSH: Pocket Guide to Chemical Hazards

| Components | Type | Value |
|---|------|------------------------|
| Lead and lead compounds (CAS 7439-92-1) | TWA | 0.05 mg/m ³ |
| Sulphuric acid (CAS 7664-93-9) | TWA | 1 mg/m ³ |

Biological limit values: No biological exposure limits noted for the ingredient(s).

ACGIH Biological Exposure Indices

| Components | Value | Determinant | Specimen | Sampling Time |
|---|----------|-------------|----------|---------------|
| Lead and lead compounds (CAS 7439-92-1) | 200 µg/l | Lead | Blood | * |

* - For sampling details, please see the source document.

Engineering Controls: Use ventilation equipment if available. Safety shower and eye bath.

Personal Protective Equipment:

- Respiratory:** Wear government approved air-purifying respirator if needed.
- Eye:** Wear safety glasses with side shields (or goggles).
- Clothing:** Wear appropriate protective clothing.
- Hand:** Wear chemical resistant gloves

Thermal hazards: When material is heated, wear gloves to protect against thermal burns.

Other Protect: No smoking, drinking and eating at working site. Wash thoroughly after handling. Wear suitable protective clothing. Use of an impervious apron is recommended.

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

| | |
|--|---|
| Physical state | Solid. |
| Form | Sulfuric acid, gelatinous. Lead, solid. |
| Color | Not available. |
| Odor | Odorless. |
| Odor threshold | Not available. |
| pH | < 1 |
| Melting point/freezing point | Not available. |
| Initial boiling point and boiling range | 235 - 240 °F (112.78 - 115.56 °C) (Sulfuric acid) |
| Flash point | Below room temperature (as hydrogen gas). |
| Evaporation rate | < 1 (n-BuAc=1) |
| Flammability (solid, gas): | |
| Upper/lower flammability or explosive limits | |
| Flammability limit – lower (%) | 4 % (Hydrogen) |
| Flammability limit - upper (%) | 74 % (Hydrogen) |
| Vapor pressure | 10 mm Hg |
| Vapor density | > 1 (Air=1) |
| Relative density | 1.27 - 1.33 |
| Solubility(ies) | |
| Solubility (water) | 100 % (Sulfuric acid) |
| Partition coefficient (n-octanol/water) | Not available. |
| Auto-ignition temperature | Not available. |
| Decomposition temperature | Not available. |
| Viscosity | Not available. |
| Other information: | |
| Explosive properties | Not explosive. |
| Oxidizing properties | Not oxidizing |



SECTION 10: STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures.

Incompatible materials: Strong bases. Combustible organic materials. Reducing agents. Finely divided metals. Strong oxidizers. Water.

Conditions to Avoid: Avoid exposure to heat and open flame, Avoid mechanical or electrical abuse and overcharge. Prevent short circuits. Prevent movement which could lead to short circuits.

Hazardous Polymerization: Will not occur.

Hazardous Decomposition Products: Sulfur dioxide. Sulfur trioxide. Carbon monoxide. Sulfuric acid. Hydrogen

SECTION 11: Toxicological information

Information on likely routes of exposure:

| | |
|--------------|--|
| Inhalation | Exposure to contents of an open or damaged battery: Harmful if inhaled. |
| Skin contact | Exposure to contents of an open or damaged battery: Causes severe skin burns. |
| Eye contact | Exposure to contents of an open or damaged battery: Causes serious eye damage. |
| Ingestion | Exposure to contents of an open or damaged battery: Harmful if swallowed. |

| | | |
|--|--|--------------|
| Symptoms Related to the physical, chemical and toxicological characteristics | Exposure to contents of an open or damaged battery: Dust may irritate the eyes and the respiratory system. | |
| Information on toxicological effects: | | |
| Acute toxicity | Exposure to contents of an open or damaged battery: Harmful if inhaled or swallowed. | |
| Components | Species | Test Results |
| Sulphuric acid (CAS 7664-93-9): | | |
| Acute | | |
| Oral | | |
| LD50 | Rat | 2140 mg/kg |
| Skin corrosion/irritation | Exposure to contents of an open or damaged battery: Causes severe skin burns | |
| Serious eye damage/eye irritation | Exposure to contents of an open or damaged battery: Causes serious eye damage. | |
| Respiratory or skin sensitization: | | |
| Respiratory sensitization | No data available. | |
| Skin sensitization | No data available. | |
| Germ cell mutagenicity | No data available. | |
| Carcinogenicity | The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mists containing sulfuric acid" as a known human carcinogen, (IARC category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid or sulfuric acid solutions. | |
| IARC Monographs. Overall Evaluation of Carcinogenicity | | |
| Lead and lead compounds (CAS 7439-92-1) | 2B Possibly carcinogenic to humans. | |
| Sulphuric acid (CAS 7664-93-9) | 1 Carcinogenic to humans. | |
| NTP Report on Carcinogens | | |
| Lead and lead compounds (CAS 7439-92-1) | Reasonably Anticipated to be a Human Carcinogen. | |
| Sulphuric acid (CAS 7664-93-9) | Known To Be Human Carcinogen. | |
| OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053) | | |
| Not regulated. | | |
| Reproductive toxicity: | None under normal conditions. Exposure to contents of an open or damaged battery: May damage fertility or the unborn child. | |
| Specific target organ toxicity-single exposure: | None under normal conditions. Exposure to contents of toxicity-single an open or damaged battery: Causes damage to organs exposure (respiratory system). | |
| Specific target organ toxicity – repeated exposure: | None under normal conditions. Exposure to contents of an open or damaged battery: Causes damage to organs through prolonged or repeated exposure: Respiratory system. | |
| Aspiration hazard | Due to the physical form of the product it is not an aspiration hazard. | |
| chronic effects: | Exposure to contents of an open or damaged battery: Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues. Chronic inhalation of sulfuric acid mist may increase the risk of lung cancer. | |



SECTION 12: ECOLOGICAL INFORMATION

| | | |
|---------------------------------------|--|---|
| Ecotoxicity: | The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment. Exposure to contents of an open or damaged battery: Very toxic to aquatic life with long lasting effects. | |
| | Components | Species |
| | Test Results | |
| | Lead and lead compounds (CAS 7439-92-1) LC50 | Rainbow trout, donaldson trout (Oncorhynchus mykiss) |
| | | 1.17 mg/l, 96 Hours |
| Persistence and degradability: | The degradation half-life of the product is not known. Lead and its compounds are highly persistent in water. | |
| Bioaccumulative potential: | Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants, but very little bioaccumulation occurs through the food chain. | |
| Mobility in soil: | If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater. | |
| Mobility in general: | The product is insoluble in water and will spread on water surfaces | |
| Other adverse effects: | None known. | |

SECTION 13: DISPOSAL CONSIDERATIONS

Appropriate Method of Disposal of substance:
 Lead-acid batteries are completely recyclable. Return whole scrap batteries to distributor, manufacturer or lead smelter for recycling. For neutralized spills, place residue in acid-resistant containers with sorbent material, sand or earth and dispose of in accordance with local, state and federal regulations for acid and lead compounds. Contact local and/or state environmental officials regarding disposal information.

SECTION 14: TRANSPORT INFORMATION

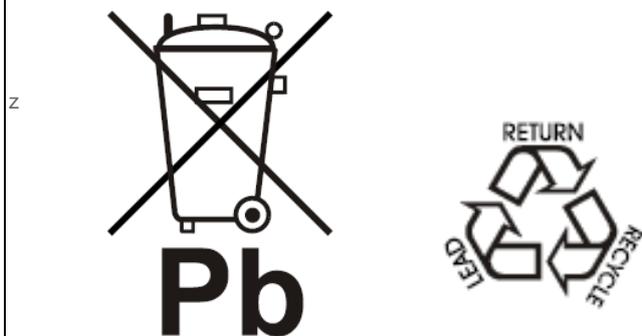
We hereby certify that all LEMANIA ENERGY Valve Regulated Lead-acid Rechargeable batteries REDTEK, TEK-HD, EXODUS, GENESIS conform to the UN2800 classification as "Batteries, wet, Non-Spillable, and electric storage" as a result of passing the Vibration and Pressure Differential Test described in D.O.T., 49 CFR 173.159(a), and IMO/IMDG, and ICAO/IATA packing instruction 872 and note A48, A67, A164 and A183. The batteries are not restricted to IMO/IMDG code according to special provision 238.

LEMANIA ENERGY Batteries having met the related conditions are EXEMPTING from hazardous goods regulations for the purpose of transportation by DOT, and IATA/ICAO, and therefore are unrestricted for transportation by any means, including air transport. For all modes of transportation, each battery outer package is labeled "NON-SPILLABLE". All our Batteries are marked non-spillable.

SECTION 15: REGULATORY INFORMATION

EU Regulation:

In accordance with EU2013/56/EU Battery Directive, VRLA batteries should present crossed-out wheeled bin symbol of lead together with the ISO recycling symbol. Does not contain any mercury (Hg<0.0005%) or cadmium (Cd<0.002%).



SECTION 16: OTHER INFORMATION

Products such as Batteries are not in the scope of regulation which requires the publication of an EU Safety Data Sheet (91/155/EEC).