

Rolls

SAFETY DATA SHEET – FLOODED LEAD ACID BATTERY

I. IDENTIFICATION

Product Identifier:
Lead acid battery, wet

Product Use:
Lead acid storage battery / electric storage battery

Manufacturer:
Surrette Battery Company Limited





Prepared By:
Surrette Battery Company Limited

Preparation Date: January 21, 2010
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Supplier Name & Address:
Surrette Battery Company Limited
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2. HAZARD IDENTIFICATION

| HEALTH | | ENVIRONMENTAL | PHYSICAL |
|---|---|--|---|
|  |  |  |  |
| Acute Toxicity (Oral/Dermal/Inhalation) | Category 4 | Aquatic Chronic 1 | Explosive Chemical, Division 1.3 |
| Skin Corrosion / Irritation | Category 1A | Aquatic Acute 1 | |
| Eye Damage | Category 1 | | |
| Reproductive | Category 1A | | |
| Carcinogenicity (lead compounds) | Category 1B | | |
| Carcinogenicity (arsenic) | Category 1A | | |
| Carcinogenicity (acid mist) | Category 1A | | |
| Specific Target Organ Toxicity (repeated exposure) | Category 2 | | |

HAZARD STATEMENTS

- DANGER!
- Harmful if swallowed, inhaled or in contact with skin
- Acid causes severe skin burns and eye damage
- May damage fertility or the unborn child if ingested or inhaled
- May cause harm to breast-fed children
- May cause cancer if ingested or inhaled
- Causes skin irritation, serious eye damage
- Contact with internal components may cause irritation or severe burns
- Causes damage to central nervous system, blood and kidneys through prolonged or repeated exposure if ingested or inhaled
- Irritating to eyes, respiratory system and skin
- May form explosive air/gas mixture during charging
- Extremely flammable gas (hydrogen)
- Explosive, fire, blast or projection hazard

SIGNAL WORD: DANGER!**PRECAUTIONARY STATEMENTS**

- Obtain special instructions before use
- Do not handle until all safety precautions have been read and understood
- Wash thoroughly after handling
- Do not eat, drink or smoke when using this product
- Avoid contact during pregnancy/while nursing
- Wear protective gloves/protective clothing, eye protection/face protection
- Avoid breathing dust/fume/gas/mist/vapors/spray
- Use only outdoors or in a well-ventilated area
- Avoid contact with internal acid
- Do not breathe dust/fume/gas/mist/vapors/spray
- Keep away from heat/sparks/open flames/hot surfaces
- If swallowed or consumed: Rinse mouth; Do not induce vomiting; Call poison center / doctor if you feel unwell
- If on clothing or skin (or hair): Remove / take off immediately all contaminated clothing and wash it before reuse; Rinse skin (hair) with water/shower
- If inhaled: Remove person to fresh air and keep comfortable for breathing; Immediately call poison center or doctor
- If in eyes: Rinse cautiously with water for several minutes; Remove contact lenses if present and easy to do; Continue rinsing; If exposed/concerned or if you feel unwell seek medical attention/advice
- Store locked up, in a well ventilated area, in accordance with local and national regulation
- Dispose of contents/container in accordance with local and national regulation
- Keep out of reach of children

3. COMPOSITION / INFORMATION ON INGREDIENTS

| INGREDIENTS (CHEMICAL / COMMON NAME) | CAS # | % BY WEIGHT |
|---|-----------|-------------|
| Lead | 7439-92-1 | 34 |
| Lead Dioxide | 1309-60-0 | 31 |
| Sulfuric Acid (Electrolyte) | 7664-93-9 | 35 |

4. FIRST-AID MEASURES

Inhalation:

Electrolyte (Sulfuric Acid) – Remove to fresh air immediately. If not breathing give artificial respiration. If breathing is difficult, give oxygen; consult a doctor.

Lead – remove from exposure, gargle, wash nose and lips; consult a doctor.

Ingestion:

Electrolyte (Sulfuric Acid) – Give large quantities of water, do NOT induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death; consult doctor.

Lead – Consult doctor immediately.

Skin:

Electrolyte (Sulfuric Acid) – Flush with large amounts of water for at least 15 minutes. Remove contaminated clothing, including shoes. Wash contaminated clothing before reuse, discard contaminated shoes. Seek medical attention if symptoms/irritation persists.

Lead – Wash immediately with soap and water.

Eyes:

Electrolyte (Sulfuric Acid) – Flush immediately with large amounts of water for at least 20 minutes while lifting lids. Seek immediate medical attention if eyes have been exposed directly to acid.

Lead – Flush immediately with large amounts of water for at least 20 minutes while lifting lids. Seek immediate medical attention if eyes have been exposed directly to lead.

5. FIRE-FIGHTING MEASURES

Flammable Limits: LEL = 4.1% (hydrogen Gas in air), UEL = 74.2%

Extinguishing Media / Agents – CO₂ (do not use directly on cells), foam, dry chemical and avoid breathing vapors; use appropriate media / agents for surrounding fire.

Fire Fighting Procedures:

Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during any application of water and wear acid-resistant clothing, gloves, face and eye protection. If batteries are on charge, shut off power to the charging equipment. *note – strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down*

Hazardous Combustion Products:

Highly flammable hydrogen gas is generated during charging and operation of batteries. If ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of the battery. Carefully follow manufacturer's instructions for installation and service.

6. ACCIDENTAL RELEASE MEASURES

Wear acid-resistant clothing, boots, gloves and face shield. Stop flow of material, contain/absorb small spills with dry sand, earth or vermiculite; do not use combustible materials. If possible, carefully neutralize spilled electrolyte with suitable alkali such as lime, soda ash or sodium bicarbonate. Do not allow discharge of un-neutralized acid to sewer. Consult federal, provincial/state and local requirements for allowed means of disposal.

Acid must be managed in accordance with approved local, provincial/state and national/federal requirements.



7. HANDLING AND STORAGE

Handling:

Unless involved in recycling operations, do not breach the casing or empty the contents of the battery. Handle carefully and avoid tipping, which may allow electrolyte leakage. There may be increased risk of electric shock from strings of connected batteries. Keep containers tightly closed when not in use. If battery case is broken, avoid contact with internal components. Keep vent caps on and cover terminals to prevent short circuits. Place cardboard between layers of stacked automotive batteries to avoid damage and short circuits. Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water. Use banding and / or stretch wrap to secure items for shipping. Wear protective clothing and equipment during handling and avoid contact with skin, eyes and clothing. Wash after handling.

Storage:

Store batteries under roof in cool, dry, well-ventilated areas separated from incompatible materials and from activities or sources that may create flame, spark or heat. Store on smooth, impervious surfaces with measures for liquid containment in the event of electrolyte spill. Keep away from metallic objects that could bridge the terminals on a battery and create a dangerous short circuit.

Charging:

There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being charged. Shut off power to chargers whenever not in use and before detachment of any circuit connections. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits (mg/m³)

| CHEMICAL | OSHA PEL | NIOSH (US) | ACGIH | QUEBEC PEV | ONTARIO OEL | OEL (EU) |
|-------------------------------------|----------|------------|-------|------------|-------------|----------|
| Lead and Lead Compounds (Inorganic) | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.15(a) |
| Sulfuric Acid (Electrolyte) | 1 | 1 | 0.2 | 1 | 0.2 | 0.05(b) |

(a) As inhalable aerosol (b) Thoracic fraction

Engineering Controls (Ventilation):

Store and handle in a well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. Charge batteries in areas with adequate ventilation. General dilution ventilation is acceptable.

Respiratory Protection:

None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed PEL, use NIOSH or MSHA approved respiratory protection.

Skin Protection:

If battery case is damaged, use rubber or plastic acid-resistant gloves with elbow length gauntlet, acid-resistant clothing, apron and boots.

Eye Protection:

If battery case is damaged, use chemical splash goggles or face shield.

Other Protection:

In areas where sulfuric acid solutions are handled in concentrations greater than 1%, and depending on exposure and workplace standards, emergency eyewash stations and showers should be provided, with unlimited water supply. Chemically impervious apron and face shield recommended when adding water or electrolyte to batteries. Wash hands after handling.

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9. PHYSICAL AND CHEMICAL PROPERTIES

The following information is relevant to ingredients only and is only valid when contents are exposed:

| ELECTROLYTE (SULFURIC ACID) | | ELECTROLYTE (SULFURIC ACID) | |
|--------------------------------------|--|---|--|
| Physical state, odor and appearance | Liquid, sharp, pungent odor, colorless | Specific Gravity (H ₂ O = 1) | 1.215 to 1.350 |
| Solubility in water (w/w) | 100% | Vapor Pressure (mm Hg) | 10 |
| Boiling point | 203-240°F | Vapor Density (Air = 1) | Greater than 1 |
| pH | ~ 1 to 2 | Flash Point | Below room temperature (as hydrogen gas) |
| Evaporation rate (Butyl Acetate = 1) | Less than 1 | % Volatile by Weight | N/A |
| Lower Explosive Limit (LEL) | 4.1% (Hydrogen) | Upper Explosive Limit (UEL) | 74.2% (Hydrogen) |

10. STABILITY AND REACTIVITY

Stability: stable unstable

This product is stable under normal conditions at ambient temperature.

Conditions to avoid:

Prolonged overcharge at high current; sources of ignition.

Incompatibilities: (materials to avoid)

Electrolyte – contact with combustibles and organic materials may cause fire and explosion; also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas. Reactions can generate a great deal of heat as does the dilution of sulfuric acid with water; never add water to acid, acid should always be slowly added to water.

Lead Compounds – avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen and reducing agents.

Hazardous Decomposition Products:

Electrolyte – sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide and hydrogen sulfide.

Lead Compounds – temperatures above the melting point are likely to produce toxic metal fume, vapor or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

Note: hazardous polymerization will not occur.

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II. TOXICOLOGICAL INFORMATION

Sulfuric Acid

Routes of entry:

Inhalation, ingestion, skin or eye contact; harmful by all routes of entry.

Inhalation – breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.

Ingestion – may cause severe irritation of the mouth, throat, esophagus and stomach.

Skin Contact – severe irritation, burns, and ulceration.

Eye Contact – severe irritation, burns, cornea damage and blindness.

Effects of Overexposure (Acute) – severe skin irritation, damage to cornea, upper respiratory irritation.

Effects of Overexposure (Chronic) – possible erosion of tooth enamel, inflammation of nose, throat and bronchial tubes.

Carcinogenicity – the International Agency for research on Cancer (IARC) has classified “strong inorganic mist containing sulfuric acid” as a Group I carcinogen, a substance that is carcinogenic to humans; This is approximately equivalent to GHS Category IA. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist.

Acute Toxicity:

| | INHALATION | ORAL |
|-----------------------------|---|----------------------------------|
| Electrolyte (Sulfuric Acid) | LC ₅₀ rat: 375 mg/m ³ | LD ₅₀ rat: 2140 mg/kg |

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions.

Contact of sulfuric acid with skin may aggravate diseases such as eczema and contact dermatitis.

Lead

Routes of entry:

Hazardous exposure can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapor or fume. The presence of nascent hydrogen may generate highly toxic arsine gas.

Inhalation – Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

Ingestion – acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping; this may lead rapidly to systemic toxicity and must be treated by a doctor.

Skin Contact – not absorbed through the skin.

Eye Contact – may cause eye irritation.

Effects of Overexposure (Acute) – symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.

Effects of Overexposure (Chronic) – Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in males and females. Repeated exposure to lead and lead compounds in the workplace may result in nervous system toxicity. Some toxicologists report abnormal conduction velocities in persons with blood lead levels of 50µg / 100mL or higher. Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues.

Carcinogenicity – listed by International Agency for Research on Cancer (IARC) as Group 2A likely in animals at extreme doses; this is approximately equivalent to GHS Category IB. Proof of carcinogenicity in humans is currently lacking.

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II. TOXICOLOGICAL INFORMATION CONT'D.**Acute Toxicity:**

| | INHALATION | ORAL |
|------------------|--|--|
| Lead (Elemental) | Acute Toxicity Point Estimate = 4500 ppmV (based on lead bullion) | Acute Toxicity Estimate (ATE) = 500 mg/kg body weight (based on lead bullion) |

Overexposure to lead and its compounds can aggravate some forms of kidney, liver and neurologic diseases.

All heavy metals, including the hazardous ingredients in this product, are taken into the body primarily by inhalation and ingestion. Most inhalation problems can be avoided by adequate precautions such as ventilation and respiratory protection covered in Section 8. Follow good personal hygiene to avoid inhalation and ingestions: wash hands, face, neck and arms thoroughly before eating, drinking, smoking or leaving the work site. Keep contaminated clothing out of non-contaminated areas, or wear cover clothing when in such areas. Restrict the use and presence of food, tobacco and cosmetics to non-contaminated areas. Work clothes and work equipment used in contaminated areas must remain in designated areas and never taken home or laundered with personal non-contaminated clothing. This product is intended for industrial use and should be isolated from children and their environment.

12. ECOLOGICAL INFORMATION

Lead is very persistent in soil and sediment, however there is no data on environmental degradation. The mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants but little bioaccumulation occurs through the food chain (most studies include lead compounds and not elemental lead).

Aquatic Toxicity:

| | | |
|---------------|---|---------------------------------|
| Sulfuric Acid | 24 hr LC ₅₀ , freshwater fish (Brachydanio rerio) | 82 mg/L |
| Sulfuric Acid | 96 hr LOEC, freshwater fish (Cyprinus carpio) | 22 mg/L |
| Lead | 48 hr LC ₅₀ (modeled for aquatic invertebrates) | <1 mg/L (based on lead bullion) |

13. DISPOSAL CONSIDERATIONS

Consult national / federal, provincial / state and local regulations for allowed means of disposal.

Spent batteries:

Send to secondary lead smelter for recycling; spent lead-acid batteries are not regulated as hazardous waste when the requirements of 40 CFR Section 266.80 are met. Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).

Electrolyte:

Place neutralized slurry into sealed acid-resistant containers and dispose of as hazardous waste, as applicable. Large water diluted spills, after neutralization and testing, should be managed in accordance with local, provincial/state and national/federal requirements.

Following local, provincial / state and national / federal regulations applicable to end of life characteristics will be the responsibility of the end user.

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14. TRANSPORT INFORMATION

The US Department of Transportation (DOT) hazardous materials regulations (49 CFR) applicable to lead acid batteries are specified in 49 CFR 173.159.

| | |
|----------------------|----------------------------------|
| Proper Shipping Name | Batteries, wet, filled with acid |
| Hazard Class | 8 |
| ID Number | UN2794 |
| Packing Group | III |
| Labels | Corrosive |

49 CFR 173.159(e) specifies that when transported by highway or rail, electric storage batteries containing electrolyte or corrosive battery acid / fluid are not subject to any other requirements of this subchapter, if all of the following are met:

- (1) No other hazardous materials may be transported in the same vehicle.
- (2) The batteries must be loaded or braced so as to prevent damage and short circuits during transit.
- (3) Any other material loaded in the same vehicle must be blocked, braced or otherwise secured to prevent contact with or damage to the batteries.
- (4) The transport vehicle may not carry material shipped by any other person other than the shipper of the batteries.

If any of the above-referenced requirements are not met, the batteries must be shipped as fully-regulated Class 8 Corrosive hazardous materials.

IATA Dangerous Goods Regulations (DGR):

| | |
|--------------------------|--|
| Proper Shipping Name | Batteries, wet, filled with acid |
| Hazard Class | 8 |
| Packing Group | N/A |
| Label / Placard Required | Corrosive |
| UN Identification | UN2794 |
| Reference | IATA Packing Instruction 870 (IATA DGR 56 th Edition) |

IMDG Code:

| | |
|--------------------------|------------------------------------|
| Proper Shipping Name | Batteries, wet, filled with acid |
| Hazard Class | 8 |
| Packing Group | N/A |
| Label / Placard Required | Corrosive |
| UN Identification | UN2794 |
| Reference | IMDG Code Packing Instruction P801 |

15. REGULATORY INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled Products regulations (CPR) and the SDS contains all information required by Controlled Products Regulations.

Distribution within Canada to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2).

Industrial lead-acid batteries, such as those used in forklifts, do NOT meet the OSHA definition of an ‘article’ (US EPA, Oct 1998). Therefore, the lead and acid that compose these batteries must be included when determining the various thresholds for these EPCRA (Emergency Planning & Community Right-to-Know Act) section regulations. The acid in lead-acid batteries is sulfuric acid, which is an Extremely Hazardous Substance (EHS). The following table outlines the applicable EPCRA sections and their respective thresholds for sulfuric acid:

| EPCRA SECTIONS | THRESHOLDS |
|---|---------------------|
| 302 – Emergency Planning Notification | TPQ \geq 1000 lbs |
| 304 – Emergency Release Notification | RQ \geq 1000 lbs |
| 311 – MSDS Reporting | *TPQ \geq 500 lbs |
| 312 – Chemical Inventory Reporting (i.e. Tier II) | *TPQ \geq 500 lbs |

* The reporting threshold for sulfuric acid is \geq the designated TPQ (Threshold Planning Quantity) or 500 lbs, whichever is less.

The lead used in lead-acid batteries does not qualify for any OSHA or EPCRA exemptions. Lead is not an EHS and the following table outlines the applicable EPCRA sections and their respective thresholds for lead:

| EPCRA SECTIONS | THRESHOLDS |
|---|-------------------|
| 311 – MSDS Reporting | \geq 10,000 lbs |
| 312 – Chemical Inventory Reporting (i.e. Tier II) | \geq 10,000 lbs |

EPCRA Section 313:

The reporting of lead and sulfuric acid (and their releases) in lead-acid batteries used in cars, trucks, most cranes, forklifts, locomotive engines and aircraft for the purposes of EPCRA Section 313 is not required. Lead-acid batteries used for these purposes are exempt for section 313 reporting per the “Motor Vehicle Exemption”. See page B-22 of the US EPA Guidance Document for Lead and Lead Compound Reporting under EPCRA Section 313 for additional information of this exemption.

15. REGULATORY INFORMATION CONT'D.**Supplier Notification:**

This product contains toxic chemicals that may be reportable under EPCRA Section 313 Toxic Chemical release Inventory (Form R) requirements. For a manufacturing facility under SIC codes 20 through 39, the following information is provided to enable you to complete the required reports:

| TOXIC CHEMICAL | CAS NUMBER | APPROXIMATE % BY WEIGHT |
|-----------------------------|------------|-------------------------|
| Lead | 7439-92-1 | 34 |
| Lead Dioxide | 1309-60-0 | 31 |
| Electrolyte (Sulfuric Acid) | 7664-93-9 | 35 |

California Proposition 65 Warning: Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

Distribution into the EU to follow applicable Directives to the Use, Import/Export of the product as-sold.

16. OTHER INFORMATION

NFPA Hazard rating for sulfuric acid:

Flammability (Red) = 0

Health (Blue) = 3

Reactivity (Yellow) = 2

Disclaimer:

This Safety Data Sheet is based upon information and sources available at the time of preparation or revision. The information was obtained from sources believed to be reliable, however, not under our supervision or control. Surrrette Battery Company Limited makes no Warranty of Merchantability or any other warranty, expressed or

implied, with respect to such information and we assume no responsibility resulting from its use. The data contained in this SDS is offered for your information, consideration and investigation. The guidelines for the safe handling and use of this product provided do not and cannot advise on every possible situation and use of this product should be assessed to determine if additional precautions are required. It is the responsibility of each user of this product to determine the suitability of this product and adhere to the requirements of all applicable laws regarding use, transport and disposal of this product.

The logo for Rolls, featuring the word "Rolls" in a large, elegant, cursive script font.