



**IV. FIRE AND EXPLOSION HAZARD DATA**

Flash Point: Not Applicable      Flammable Limits: LEL=Non Applicable    UEL=Non Applicable

Extinguishing Media: CO2; foam; dry chemical; water; water fog

Special Fire Fighting Procedures: Water applied to sulfuric acid generates heat and causes acid to splatter. Wear full-cover sulfuric acid resistant clothing.

Unusual Fire and Explosion hazards: Reacts violently with metals, nitrates, chlorates, carbides and other organic materials. Reacts with most metals to yield explosive and flammable hydrogen gas.

**V. REACTIVITY DATA**

<u>Stability:</u>	100% Stable
<u>Conditions to Avoid:</u>	Contact with organic materials, combustibles, strong reducing agents, metals, strong oxidizers, water.
<u>Incompatibility:</u>	Contact with metals may produce toxic sulfur dioxide fumes and/or hydrogen gas.
<u>Hazardous Decomposition Products:</u>	Sulfur trioxide, carbon monoxide, sulfuric acid fumes, sulfur dioxide
<u>Hazardous Polymerization:</u>	Will not occur

**VI. HEALTH HAZARD DATA**

Routes of Entry: Sulfuric acid is 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 mouth, throat, esophagus and stomach.

Skin Contact: Severe irritation, burns and ulceration.

Eye Contact: Severe irritation, burns, cornea damage, blindness.

Effects of Overexposure - Acute: Severe skin irritation, damage to cornea, upper respiratory irritation.

Effects of Overexposure - Chronic: Erosion of tooth enamel; inflammation of nose, throat and bronchial tubes.

**VI. HEALTH HAZARD DATA CONTINUED**

Carcinogenicity: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category I carcinogen, a substance that is carcinogenic to humans. 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. Batteries subjected to abusive charging at excessively high currents for prolonged periods of time without vent caps in place may create a surrounding atmosphere of the offensive strong inorganic acid mist containing sulfuric acid.

Symptoms of Exposure: Cough; increased respiratory rate; stinging, burning sensation on skin; eye irritation; discoloration of teeth.

Medical Conditions Generally Aggravated by Exposure: Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of sulfuric acid with skin may aggravate skin diseases such as eczema and contact dermatitis.

Emergency and First Aid Procedures:

Inhalation: Remove to fresh air immediately. If breathing is difficult, give oxygen.

Ingestion: Give large quantities of water; DO NOT INDUCE VOMITING; consult physician.

Skin: Flush with large amounts of cool water for at least 15 minutes; remove contaminated clothing, including shoes.

Eyes: Flush immediately with large amounts of cool water for at least 15 minutes; consult physician.

**VII. PRECAUTIONS FOR SAFE HANDLING AND USE**

Spill or Leak Procedures: Stop flow of material, contain/absorb small spills with dry sand, earth, vermiculite. Do not use combustible materials. If possible, carefully neutralize the spill with soda ash, sodium bicarbonate, lime, etc. If used, cautiously dilute with water. Wear acid-resistant clothing, boots, gloves, and face shield. Do not allow discharge of unneutralized acid to sewer.

Waste Disposal Methods: Place neutralized slurry in sealed containers and dispose of as hazardous waste, as applicable. Large water-diluted spills, after neutralization and testing, should be managed in accordance with local, state and federal requirements. Consult state environmental agency and/or federal EPA.

Handling and Storage: Handle cautiously; avoid contact with skin and eyes. Storage and handling areas should be equipped with proper containment to capture and neutralize spills. In addition, these areas should be equipped with eyewash stations and safety showers.

Precautionary Labeling: POISON - CAUSES SEVERE BURNS  
DANGER - CONTAINS SULFURIC ACID

**VIII. CONTROL MEASURES**

Engineering Controls: Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant.

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.

Protective gloves: Rubber or plastic acid-resistant gloves with elbow-length gauntlet.

Eye Protection: Chemical goggles or face shield.

Other Protection: Acid-resistant apron. Under severe exposure or emergency conditions, wear acid-resistant clothing and boots.

Emergency Flushing: In areas where sulfuric acid is handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply.

**IX. OTHER REGULATORY INFORMATION**

NFPA Hazard Rating for sulfuric acid:

Flammability (Red) = 0  
Health (Blue) : = 3  
Reactivity (Yellow): = 2

Sulfuric acid is water-reactive if concentrated.

U.S DOT

The transportation of electrolyte within the continental United States is regulated by the U.S. DOT through the Code of Federal Regulations, Title 49 (CFR 49). These regulations classify electrolyte as a hazardous material. Electrolyte must be packed according to 173.154, 173.202 or 173.242 depending upon the nature of the shipment. The shipping information for electrolyte is as follows:

Proper Shipping Name: Battery Fluid, Acid  
Hazard Class: 8  
UN Identification: UN2796  
Packing Group: II  
Label/Placard Requirement: Corrosive

When battery fluid is shipped in a carton with a dry battery, CFR 49, 172.102 special provision N6 states that this combination packaging must conform either section 173.159 (g) or (h).

**IX. OTHER REGULATORY INFORMATION CONTINUED**IATA

The international transportation of electrolyte is regulated by the International Air Transport Association (IATA). These regulations also classify electrolyte as a hazardous material. Electrolyte must be packed according to IATA Packing Instruction Y809. The shipping information is as follows:

Proper Shipping Name: Battery Fluid, Acid  
Hazardous Class: 8  
UN Identification: UN2796  
Packing Group: II  
Label/Placard Required: Corrosive

IMDG

The international transportation of electrolyte is regulated by the International Maritime Dangerous Goods code (IMDG). These regulations also classify electrolyte as a hazardous material. Electrolyte must be packed according to IMDG code page 8230. The shipping information is as follows:

Proper Shipping Name: Battery Fluid, Acid  
Hazard Class: 8  
UN Identification: UN2796  
Packing Class: II  
Label/Placard Required: Corrosive

RCRA: Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number 002 (corrosivity).

CERCLA (Superfund) and EPCRA

(a) Reportable Quantity (RQ) for spilled 100% sulfuric acid under CERCLA (Superfund) and EPCRA (Emergency Planning Community Right to Know Act) is 1,000 lbs. State and local reportable quantities for spilled sulfuric acid may vary.

(b) Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA, with a Threshold Planning Quantity (TPQ) of 1,000 lbs.

(c) EPCRA Section 302 notification is required if 1,000 lbs. or more of sulfuric acid is present at one site. The quantity of sulfuric acid will vary by battery type. Contact your Yucell representative for additional information.

(d) EPCRA Section 312 Tier 2 reporting is required for batteries if sulfuric acid is present in quantities of 500 lbs. or more and/or if lead is present in quantities of 10,000 lbs. or more.

<b>YUCELL</b> INDUSTRY LIMITED	MATERIAL SAFETY DATA SHEET	For Battery Electrolyte
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<b>IX. OTHER REGULATORY INFORMATION CONTINUED</b>
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(e) Supplier Notification: This product contains toxic chemicals which may be reportable under EPCRA Section 313 Toxic Chemical Release Inventory (Form R) requirements. If you are a manufacturing facility under SIC codes 20 through 39, the following information is provided to enable you to complete the required reports:

<u>Toxid Chemical</u>	<u>CAS Number</u>	<u>Approximate % by Wt.</u>
Sulfuric Acid	7664-93-9	30-40

If you distribute this product to other manufacturers in SIC Codes 20 through 39, this information must be provided with the first shipment of each calendar year.

TSCA

Ingredients in battery electrolyte are listed in the BCA Registry as follows:

<u>Components</u>	<u>CAS Number</u>	<u>BCA Status</u>
Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )	7664-93-9	Listed

CAA

Yucell Industry Ltd. supports preventative actions concerning ozone depletion in the atmosphere due to emissions of CFC's and other ozone depleting chemicals (ODC's), defined by the USEPA as Class I substances. Pursuant to Section 611 of the Clean Air Act Amendments (CAAA) of 1990, finalized on January 19, 1993, Yucell, established a policy to eliminate the use of Class I ODC's prior to the May 15, 1993 deadline.

California Proposition 65:

- Electrolyte contains sulfuric acid, known to the State of California to cause cancer, or birth defects or other reproductive harm.
- Batteries also contain other chemicals known to the state of California to cause cancer.
- Wash hands after handling.