

I. PRODUCT IDENTIFICATION

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MANUFACTURER Yucell Industry Limited
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North Hubin Road, Xiamen, China

CHEMICAL/TRADE NAME: Valve Regulated Lead-Acid Battery

**CHEMICAL FAMILY/
CLASSIFICATION** Electric Storage Battery – Non-Spillable

EMERGENCY RESPONSE TELEPHONE NUMBERS (24-HOUR): CHEMTREC INTERNATIONAL 86-13806090294

FOR NON-EMERGENCY INFORMATION: 86-592-5558101

DATE ISSUED: August 2006

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Components-Chemical/Common Names	CAS Number	Approximate % by Weight or Volume	Approximate Air Exposure Limits (ug/m ³)		
			OSHA	ACGIH	NIOSH
Inorganic Lead Compound:					
Lead	7439-92-1	63-78	50	150	100
*Antimony	7440-36-0	0.2	500	500	—
*Tin	7440-31-5	0.006	2000	2000	—
*Calcium	7440-70-2	0.002	--	--	--
*Arsenic	7440-38-2	0.003	10	200	--
Electrolyte (Sulfuric acid)	7664-93-9	10-30	1000	1000	1000
Case Material:		5-6	N/A	N/A	N/A
Polypropylene	9003-07-0				
Polystyrene	9003-53-6				
Styrene Acrylonitrile	9003-54-7				
Acrylonitrile Butadiene Styrene	9003-56-9				
Styrene Butadiene	9003-55-8				
Polyvinylchloride	9002-86-2				
Polycarbonate	---				
Hard Rubber	---				
Polyethylene	---				
Plate separator material:	---				

* Inorganic lead and electrolyte (water and sulfuric acid solution) are the primary components of every battery manufactured by Yucell Industry Limited. Other ingredients may be present dependent upon battery type. Contact your Yucell representative for additional information.

III. PHYSICAL DATA

APPEARANCE and ODOR: Manufactured article; no odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.

ELECTROLYTE:

BOILING POINT: 203-204°F

MELTING POINT: NA

SOLUBILITY IN WATER: 100%

EVAPORATION RATE: Less than 1
(Butyl acetate=1)

SPECIFIC GRAVITY (H₂O=1): 1.215 to 1.350

VAPOR PRESSURE: 10mmHg

VAPOR DENSITY (AIR=1): >1

% VOLATILES BY WEIGHT: NA

IV. FIRE AND EXPLOSION HAZARD DATA

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FLASH POINT: NA
LOWER EXPLOSIVE LIMIT (LEL): 4.1% (as hydrogen gas)
UPPER EXPLOSIVE LIMIT (UEL): 74.2% (as hydrogen gas)
EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, foam, water. Do not use water on live electrical circuits.

SPECIAL FIRE FIGHTING PROCEDURES & PROTECTIVE EQUIPMENT:

If batteries are on charge, shut off power. Avoid breathing vapors. Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application; wear acid-resistant protective gear.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Highly flammable hydrogen gas is generated during charging and operation of batteries. To avoid risk of fire or explosion, keep sparks or other sources of ignition away from batteries. Do not allow metallic materials to simultaneously contact negative and positive terminals of cells and batteries. Follow manufacturer's instructions for installation and service.

Additional information: Firefighting water runoff and dilution water may be toxic and corrosive and may cause adverse environmental impacts.

V. REACTIVITY DATA

STABILITY: This product is stable under normal conditions at ambient temperature.
INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with strong bases, acids, combustible organic materials, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen, reducing agents and water.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition of electrolyte will produce sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide and hydrogen. High temperatures of lead compounds will likely produce toxic metal fume, vapor or dust; contact with strong acid/base or presence of nascent hydrogen may generate highly toxic arsine gas.

CONDITIONS TO AVOID: Prolonged overcharge; sources of ignition.

VI. HEALTH HAZARD DATA**POTENTIAL HEALTH EFFECTS:**

ROUTES OF ENTRY: Sulfuric acid: Harmful by all routes of entry.
Lead compounds: Hazardous exposure can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapor or fume.

INHALATION: Respiratory tract irritation and possible long term effects.

INGESTION: May cause severe irritation/burns of mouth, throat, esophagus and digestive tract, and harmful or fatal lead poisoning. Lead ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead rapidly to systemic toxicity and must be treated by a physician.

SKIN: Direct contact with electrolyte may cause severe irritation, burns and ulceration.

EYES: Direct contact with electrolyte may cause severe irritation, burns, cornea damage, or blindness.

ACUTE HEALTH HAZARDS: Repeated or prolonged contact may cause skin irritation, damage to cornea, and upper respiratory irritation. Symptoms of lead toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.

CHRONIC HEALTH HAZARDS: Overexposure to sulfuric acid, an internal component of the battery, may cause possible erosion of tooth enamel, inflammation of nose, throat and bronchial tubes. Lead absorption may cause nausea, weight loss, abdominal spasms, fatigue, and pain in arms, legs and joints. Other effects may include central nervous system damage, kidney dysfunction, anemia, neuropathy, particularly of the motor nerves, with wrist drop, and potential reproductive effects.

CARCINOGENICITY:

SULFURIC ACID: 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. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist.

VI. HEALTH HAZARD DATA continued

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LEAD COMPOUNDS: Lead is listed as a 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.

ARSENIC: Listed by National Toxicology Program (NTP), International Agency for Research on Cancer (IARC), OSHA and NIOSH as a carcinogen only after prolonged exposure at high levels.

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. Lead and its compounds can aggravate some forms of kidney, liver and neurological diseases. Children and pregnant women must be protected from lead exposure. Persons with kidney disease may be at increased risk of kidney failure.

Additional Information: No health effects are expected related to normal use of this product as sold.

VII. FIRST AID PROCEDURES**INHALATION:**

Sulfuric acid: If breathing is difficult, remove to fresh air immediately. If symptoms persist, seek medical attention.

Lead: Remove from exposure, gargle, wash nose and lips; consult physician.

INGESTION:

Sulfuric acid: Give large quantities of water; do **NOT** induce vomiting; consult physician.

Lead: Consult physician immediately.

SKIN CONTACT:

Sulfuric acid: Flush with large amount of water for at least 15 minutes. Remove contaminated clothing, including shoes.

Lead: Wash immediately with soap and water.

EYE CONTACT:

Sulfuric Acid and Lead: Flush immediately with large amounts of water for at least 15 minutes; consult physician.

VIII. PRECAUTIONS FOR SAFE HANDLING AND USE**SPILL OR LEAK PROCEDURES:**

Stop flow of material; contain/absorb small spills with dry sand, earth, and vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Prevent spilled material from entering sewers and waterways.

WASTE DISPOSAL METHODS:

Spent batteries: Send to secondary lead smelter for recycling.

Place neutralized slurry into sealed containers and handle as applicable with state and federal regulations. Large water-diluted spills, after neutralization and testing, should be managed in accordance with approved local, state and federal requirements. Consult state environmental agency and/or federal EPA.

HANDLING AND STORAGE:

- Store batteries in cool, dry, well-ventilated area.
- Batteries should also be stored under roof for protection against adverse weather conditions.
- Protect containers from physical damage to avoid leaks and spills.
- If battery case is broken, avoid contact with internal components.
- Place cardboard between layers of stacked batteries to avoid damage and short circuits.
- Do not allow conductive material to touch the battery terminals. A short circuit may occur and cause battery failure and fire.
- Keep away from fire, sparks and heat.

PRECAUTIONARY LABELING:

POISON - CAUSES SEVERE BURNS
DANGER – CONTAINS SULFURIC ACID
KEEP AWAY FROM CHILDREN

IX. CONTROL MEASURES

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ENGINEERING CONTROLS:

Store and charge in well-ventilated area. General dilution ventilation is acceptable.

WORK PRACTICES:

Handle batteries cautiously, do not tip to avoid spills. Avoid contact with internal components. Wear protective clothing when filling or handling batteries. Wash hands after handling.

RESPIRATORY PROTECTION:

None required under normal conditions. See special firefighting procedures (Section IV).

SKIN PROTECTION:

Wear rubber or plastic acid-resistant gloves as a standard procedure to prevent skin contact.

EYE PROTECTION:

Wear protective glasses with side shields or chemical goggles or face shield.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

None required under normal use conditions for absorbed electrolyte type batteries.

X. 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.

TRANSPORTATION INFORMATION:

GROUND – US DOT: No proper shipping name; not regulated as a hazardous material.

Yucell VRLA batteries have been tested and meet the non-spillable criteria listed in CFR 49, 173.159 (d) (3) (i) and (ii). Non-spillable batteries are excepted from CFR 49, Subchapter C requirements, provided that the following criteria are met:

1. The batteries must be protected against short circuits and securely packaged.
2. The batteries and their outer packaging must be plainly and durably marked "NON-SPILLABLE" or "NONSPILLABLE BATTERY".

AIRCRAFT – ICAO-IATA: No proper shipping name; not regulated as a hazardous material.

Yucell VRLA batteries have been tested and meet the non-spillable criteria listed in IATA Packing Instruction 806 and Special Provision A67. These batteries are excepted from all IATA regulations provided that the battery terminals are protected against short circuits.

The words "Not Restricted, as per Special Provision A67" must be included in the description on the Air Waybill.

VESSEL – IMO-IMDG: No proper shipping name; not regulated as a hazardous material.

Yucell VRLA batteries have been tested and meet the non-spillable criteria listed in IMDG Code Special Provision 238 .1 and .2; therefore, are not subject to the provisions of the IMDG Code provided that the battery terminals are protected against short circuits when packaged for transport.

Additional Information:

- Each battery and the outer packaging must be plainly and durably marked "Nonspillable" or "Nonspillable Battery".
- Transport requires proper packaging and paperwork, including the nature and quantity of goods, per applicable origin/destination/customs points as-shipped.

WASTE DISPOSAL/RCRA: Spent lead-acid batteries are not regulated as hazardous waste by the EPA when recycled, however state and international regulations may vary.

X. OTHER REGULATORY INFORMATION continued

CERCLA (Superfund) and EPCRA:

- (a) Reportable Quantity (RQ) for spilled 100% sulfuric acid under CERCLA (Superfund) and EPCRA (Emergency Planning Community Right to Know) 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.
- (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:

Toxic Chemical	CAS Number	Approximate % by Wt.
Lead	7439-92-1	70
Sulfuric Acid	7664-93-9	10-30
* Antimony	7440-36-0	0.2
* Arsenic	7440-38-2	0.003

*Not present in all battery types. Contact your Yucell representative for additional information.

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.

The Section 313 supplier notification requirement does not apply to batteries, which are "consumer products".

TSCA: Ingredients in Yucell's batteries are listed in the TSCA Registry as follows:

Components	CAS Number	TSCA Status
Electrolyte		
Sulfuric Acid	7664-93-9	Listed
Inorganic Lead Compound:		
Lead (Pb)	7439-92-1	Listed
Lead Oxide (PbO)	1917-36-8	Listed
Lead Sulfate (PbSO ₄)	7446-14-2	Listed
Antimony (Sb)	7440-36-0	Listed
Arsenic (As)	7440-38-2	Listed
Calcium (Ca)	7440-70-2	Listed
Tin (Sn)	7440-31-5	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:

WARNING:

- This product contains lead, a chemical known to the state of California to cause cancer and reproductive harm.
- Batteries also contain other chemicals known to the state of California to cause cancer.
- Wash hands after handling.

DISCLAIMER:

This Material Safety Data Sheet is based upon information and sources available at the time of preparation or revision date. We do not assume responsibility and disclaim liability for loss, damage or expense in any way connected with the handling, storage, use of, or disposal of the product. For additional information concerning Yucell Industry Ltd. products or questions concerning the content of this MSDS please contact your Yucell representative.