

## Product Information Sheet

<p>Rockwell Automation 1201 South Second Street Milwaukee, WI 53204 Telephone: 414.382.2000 Internet: <a href="http://www.rockwellautomation.com">www.rockwellautomation.com</a> Date of preparation: June 27, 2016</p>	<p>Product: Lead Acid Battery Pack Type: Sealed, Non-spillable, Wet Rockwell Automation Catalog No: 1609-500SBAT Cell Manufacturer: EnerSys Cyclon Assembly Manufacturer: APC (Schneider-Electric) Assembly Mfg Part No.: RBC60</p>
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### Product Identification

Rockwell Automation has assigned catalog number 1609-500SBAT to a Non-spillable, Wet Lead Acid Battery Pack Assembly which is supplied by APC (Schneider Electric), APC part number RBC60. The battery pack assembly uses Cyclon cells manufactured by EnerSys. The Safety Data Sheets (SDS) from Schneider Electric Inc. and EnerSys for this Lead Acid Battery follows.

### Product Classification

The Rockwell Automation Lead Acid Battery Pack Assembly, catalog no. 1609-500SBAT, conforms to the UN2800 classification as "Batteries, Wet, Non-spillable, and electric storage" and is EXEMPT from hazardous goods regulations as the following requirements are met:

- US DOT 49CFR, 173.159(f)
- IATA/ICAO, Packing Instructions 872 / Special Provision A67
- IMO/IMDG Special Provisions 238

### Additional Information

Rockwell Automation is committed to demonstrating the highest standard of global environmental management. We embrace this as a core value and an integral part of all operations and seek continual improvement of our environmental management system and performance.

You can find additional information regarding Rockwell Automation Product Environmental Compliance programs at:

<http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>

Please send any additional inquiries regarding Product Environmental Compliance to:

[ProductStewardship@ra.rockwell.com](mailto:ProductStewardship@ra.rockwell.com)

**Product Safety Data Sheet (SDS) follows**



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# MATERIAL SAFETY DATA SHEET

## BATTERY PACK CONTAINING LEAD ACID BATTERY

Issue Date January 2015  
Version 1.7

### IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Company Name: Schneider Electric IT USA (formerly APC by Schneider Electric, APC Sales and Service Corp.)  
Address: 132 Fairgrounds Road  
West Kingston, RI 02892  
Tel: 800-788-2208 or 401-789-5735  
Contact: [https://www.apcc.com/support/contact/ask\\_apc.cfm](https://www.apcc.com/support/contact/ask_apc.cfm)  
Web: [www.APC.com](http://www.APC.com)

### SECTION 1: HAZARDS IDENTIFICATION

**Product Name:** Battery pack containing Lead Acid Battery  
**Other Names:** Lead Acid Battery Wet, non-spillable,  
**Manufacturer's Product Code:** (APC)RBCXXX(L) or SYBTXXX(-PLP) (where XXX is 001 through 999 and APC and L are optional)  
YYYY(XXX)BP (where YYYY are letters including SU, SUA, SMT, SRC, UX, UXA or SURT and XXX is 24, 48 or 192)  
**Chemical Family:** Electrical Storage Battery  
**VOL/WGT:** Varies with model  
**UN Number:** 2800  
**Dangerous Goods Class:** 8  
**Packaging Group** III  
**Hazchem Code:** 2W  
**Use:** Electric Storage Battery

### SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number:	Proportion:
Lead	7439-92-1	30-60%
Sulfuric Acid	7664-93-9	20-40%
Lead Dioxide	1309-60-0	10-30%

Percentages of components are dependent on both the model of the RBC and the state of charge/discharge of the battery.

NOTE: The Sealed Lead Acid batteries used in APC by Schneider Electric Replacement Battery Cartridges (RBCs) are contained within cartridges and are sealed, non-spillable design. Under normal use and handling, there is no contact with the internal components of the battery or the chemical hazards. Under normal use and handling, these products do not emit regulated or hazardous substances. Misuse of the product, such as overcharging, may result in a discharge of battery electrolyte.



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### SECTION 3: PHYSICAL AND CHEMICAL PROPERTIES

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<b>Appearance:</b>	The RBC is a manufactured article that contains discrete battery elements. The Batteries contain a sulfuric acid electrolyte (Electrolyte).  The battery is a manufactured article consisting of a plastic, sealed case, terminals and flame arrestor vent caps. Case color varies. The electrolyte is contained within the case and consists of the electrolyte held captive in an adsorbed glass mat (AGM) or gel matrix. There is no "free" electrolyte to leak out of the case. Product is essentially odorless
<b>Boiling Point:</b>	(Electrolyte) 110°C to 112°C.
<b>Melting Point</b>	>149 °C for plastic case
<b>Vapor Pressure:</b>	(Electrolyte) 13 to 22 mmHg@ 25°C.
<b>Specific Gravity:</b>	(Electrolyte) 1.300 @25°C.
<b>Flashpoint:</b>	(Electrolyte) Not Applicable.
<b>Flammability Limits:</b>	(Electrolyte) Not Applicable.
<b>Solubility in Water:</b>	(Electrolyte) Lead and Lead Oxide are insoluble in water. Sulfuric Acid is 100% soluble in water.

#### Other Properties:

Sulfuric Acid: Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulphur trioxide gas, strong oxidizers and water. Contact with metals may produce toxic sulphur dioxide fumes and may release flammable hydrogen gas.

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

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### SECTION 4: FIRST AID MEASURES

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#### Battery Electrolyte

<b>Inhalation</b>	Remove from exposure. Seek medical attention.
<b>Skin</b>	Flush the exposed skin with large amounts of water for 15 minutes. Remove contaminated clothing. Seek medical attention.
<b>Eyes</b>	Force eyes open and rinse with clean, cool, running water for 15 minutes. Do not use eye drops or other medication unless advised to do so by a doctor. Seek medical attention immediately after rinsing.
<b>Ingestion</b>	Do not induce vomiting. If conscious, drink large quantities of milk or water. Follow with milk of magnesia, beaten egg, egg whites or vegetable oil. Seek medical attention immediately.
<b>Workplace Facilities:</b>	Provide emergency Showers and eyewash facilities.

Wash hands thoroughly after working with batteries and before eating, drinking or smoking.

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## SECTION 5: FIRE FIGHTING MEASURES

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<b>Flash Point:</b>	Not Applicable
<b>Autoignition temperature:</b>	Not Applicable
<b>Flammable Limits:</b>	(Hydrogen Gas) 4.1% LEL, 74.2% UEL
<b>Fire Fighting:</b>	Use Carbon Dioxide or Dry Chemical extinguishers. Fire fighter to wear acid-resistant full protective clothing, including rubber footwear and self-contained breathing apparatus. Water should not be used unless from a safe distance due to vigorous and exothermic reaction which will result.
<b>Explosion:</b>	Hydrogen and oxygen gases are produced during normal battery operation and charging. These gases escape through the battery vents and may form an explosive atmosphere around the battery if ventilation is poor. Avoid open flame, sparks and other ignition sources in areas where batteries are used or stored.
<b>Special Information:</b>	Sulfuric acid is an oxidizer and can ignite combustibles upon contact.
<b>Hazardous Combustion:</b>	Acid mists and vapors, toxic fumes from burning plastic

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## SECTION 6: STABILITY AND REACTIVITY

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<b>Stable:</b>	Yes
<b>Conditions to Avoid:</b>	Use only approved charging methods. Avoid overcharging. Avoid short-circuiting. Avoid sparks and other ignition sources. Keep away from oxidizing and reducing materials. Do not open, break or melt the casing.
<b>Incompatible Materials:</b>	Heat, open flames, sparks, strong oxidizing or reducing agents.
<b>Hazardous Decomposition:</b>	Can emit highly toxic fumes when heated. Combustion can produce carbon dioxide and carbon monoxide. Will release an explosive hydrogen/oxygen gas mixture. Oxides of lead, lead and/or lead compounds may be released. Sulfuric acid may release sulfur dioxide and/or sulfur trioxide.
<b>Hazardous Polymerization:</b>	Will not occur

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## SECTION 7: HANDLING AND STORAGE

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<b>Storage Temperature:</b>	Min: -20°F (-28°C) for fully charged batteries. 20°F (-6°C) for completely discharged batteries. Max: 80°F (26°C) for low shelf discharge but up to 100°F (38°C) is safe.
<b>Shelf Life:</b>	Not determined.
<b>Special Sensitivity:</b>	Avoid direct conductive connection across positive and negative terminals to prevent short circuit.
<b>Storage Precautions:</b>	Batteries should be kept in an upright position away from ignition sources. Stack batteries so as to prevent accidental contact between terminal and/or other damage to terminals or containers. Whenever feasible, store on shipping pallet or rack. Do not stack loaded pallets or racks on top of other batteries. Store batteries in cool, well-ventilated location. Avoid storage in areas exposed to heat or solar buildup.

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## SECTION 8: EXPOSURE CONTROL/ PERSONAL PROTECTION

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- Eye Protection:** Chemical splash goggles or a full-face shield with safety glasses.
- Skin Protection:** Acid resistant clothing with rubber/neoprene boots for major spill clean-up.
- Protective Gloves:** Acid resistant gloves such as rubber, neoprene, vinyl coated, PVC.
- Respiratory Protection:** Use NIOSH approved respiratory protection when concentrations exceed exposure guidelines.
- Other Protective Equipment:** Lab apron, acid resistant steel-toed boots and protective clothing.
- Ventilation:** Must be provided when charging in an enclosed area.
- Engineering Controls:** Use only in well ventilated area.
- Workplace/Hygienic Practices:** Upon skin contact, wash thoroughly with soap and water. Keep work areas clean.

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## SECTION 9: TOXICOLOGICAL INFORMATION

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- Toxicology Data:** Wet storage batteries are sealed articles. Exposure to lead, acid and lead contaminated acid is not anticipated during normal storage, handling and intended use or maintenance of the battery. Battery recycling personnel should carefully follow established employer protocols when processing batteries and battery components.
- Eye Effects:** Sulfuric Acid - Severe eye irritant
- Skin Effects:** Sulfuric Acid - Extremely irritating, corrosive, and toxic to tissue, resulting in rapid destruction of tissue, causing severe burns. If much skin is involved, exposure is accompanied by shock, collapse and symptoms similar to those seen in severe burns. Repeated contact with dilute solutions can cause dermatitis.
- Ingestion Effects:** Lead - Poison by ingestion in large dosages and with prolonged exposure leading to the same effects as seen in exposure by inhalation. Adults absorb 5-15% of ingested lead and retain less than 5%. Children absorb about 50% and retain about 30%.
- Sulfuric Acid - Moderately toxic by ingestion.
- Inhalation Effects:** Lead - For industry, inhalation is much more important than is ingestion. Systemic effects include loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis and liver changes. Major organ systems affected are the nervous system, blood system and kidneys. Experimental evidence suggests that blood levels of lead below 10 µg/dL can lower the IQ scores of children. Low levels of lead impair neurotransmission and immune system function and may increase systolic blood pressure. Reversible kidney damage can occur from acute exposure. Chronic exposure can lead to irreversible vascular sclerosis, tubular cell atrophy, interstitial fibrosis, and glomerular sclerosis. Very heavy intoxication can sometimes be detected by formation of a dark line on the gum margins.



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Sulfuric Acid - Experimental poison by inhalation. Repeated or prolonged inhalation of sulfuric acid mist can cause inflammation of the upper respiratory tract, leading to chronic bronchitis. Severe exposure may cause chemical pneumonitis. Erosion of tooth enamel due to strong acid fume exposure has been observed in industry. Workers exposed to low concentrations of the vapors gradually lose their sensitivity to its irritating action.

Occupational exposures to strong-acid mists containing sulfuric acid have been associated with several respiratory tract cancers. However, there is no animal data supporting the carcinogenicity of sulfuric acid. Sulfuric acid has been found to be non-mutagenic, and in two studies of workers employed in lead acid battery manufacture, no association between sulfuric acid mist exposure and respiratory tract cancers was observed.

**Mutagenicity:** Lead - Human mutation data reported.

**Reproductive Effects:** Lead - Severe toxicity can cause sterility, abortion, and neonatal mortality and morbidity. Experimental teratogen. Experimental reproductive effects. Pathological lesions have been found on male gonads.

Sulfuric Acid - Experimental teratogen.

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## SECTION 10: REGULATORY INFORMATION

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### NFPA HAZARD RATING FOR SULFURIC ACID:

Flammability (Red) =0  
Health (Blue) =3  
Reactivity (Yellow) =2  
Sulfuric acid is water-reactive if concentrated.

**Proposition 65 Notice:** The State of California has determined that certain battery terminals contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. The only possible exposure would be to terminal posts on the battery. RBC terminals and other ancillary components do not contain lead.

### CERCLA (Superfund) and EPCRA:

- 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.
- Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA, with a Threshold Planning Quantity (TPQ) of 1,000 lbs.
- EPCRA Section 302 notification is required if 1,000 lbs. of more of sulfuric acid is present at one site. The quantity of sulfuric acid will vary by battery type. Contact your Yuasa Battery representative for additional information.
- 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.
- 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 7	664-93-9	10-30

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## SECTION 11: TRANSPORT INFORMATION

The Department of Transportation (DOT) regulatory requirements affecting the packaging and transportation of batteries containing acid or alkali are contained in the Code of Federal Regulations, 49 CFR Section 173.159. The batteries used in APC Uninterruptible Power Supplies are non-spillable wet, electric storage batteries. When shipped in the original factory packaging or contained within UPSs, batteries are excepted from the requirements of the DOT's hazardous materials regulations because they meet the requirements of 49 CFR 173.159a.

A brief summary of the requirements to classify a battery as non-spillable follows:

- Batteries can be considered as non-spillable provided they are capable of withstanding a vibration test and pressure differential test (173.159(f))
- Non-spillable batteries are subject to incident reporting requirements (173.159a(b))
- Non-spillable batteries are excepted from the packaging requirements of §173.159 under the following conditions: (173.159a(c))
  1. Non-spillable batteries must be securely packed in strong outer packagings and meet the requirements of §173.159(a).
  2. The battery and outermost packaging must be plainly and durably marked "NON-SPILLABLE" or "NON-SPILLABLE BATTERY."
- Non-spillable batteries are excepted from all other requirements of this subchapter when offered for transportation and transported in accordance with paragraph (c) of this section and the following: (173.159a(d))
  1. (1) At a temperature of 55 °C (131 °F), the battery must not contain any unabsorbed free-flowing liquid, and must be designed so that electrolyte will not flow from a ruptured or cracked case; and
  2. For transport by aircraft, when contained in a battery-powered device, equipment or vehicle must be prepared and packaged for transport in a manner to prevent unintentional activation in conformance with §173.159(b)(2) of this Subpart. APC RBCs are packed in such a way to prevent short circuits, securely packaged, marked "NON-SPILLABLE" or "NON-SPILLABLE BATTERY", and have been tested by an independent laboratory in accordance with the DOT regulations. **Therefore, they do not require performance oriented packaging, hazardous materials markings (eg., UN number), or a hazardous materials label.**

The APC RBCs manufactured batteries listed above are also excepted from the IATA Dangerous Goods Regulations pursuant to Special provisions A48, A67, A164, A183 and Packing Instruction 872. The words "Not Restricted" and the Special Provision numbers must be included in the description of the substance on the Air Waybill as required by 8.2.6, when an Air Waybill is issued (for APC RBCs, that would be A67)

Transportation of hazardous materials by sea is governed by the IMO's International Maritime Dangerous Goods (IMDG) Code. Under the IMDG Code, in order to be classified as a non-spillable lead acid battery and excepted from sea transportation regulations, the battery must meet the requirements of Special Provision 238.1 (which contains the Vibration and Pressure Differential Tests referenced above) AND the requirements of Special Provision 238.2 noted below.

IMDG Code Special Provision 238.2 – Non-spillable batteries are not subject to the provisions of this [IMDG] Code if, at a temperature of 55° C, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, when packaged for transport, the terminals are protected from short circuit. APC batteries listed above are excepted from IMDG regulations pursuant to the requirements above.

**This notice is to clarify to shippers and transporters that APC Replaceable Battery Cartridges are packaged and marked in accordance with 49 CFR 173.159a and are determined to be in compliance with DOT HMR49 Non-Hazardous Materials, the International Air Transportation Association (IATA), Special Provisions S.P. A48, A67, A164, A183 & Packaging Instruction 872 and IMDG S.P. 238.1 & 238.2. Therefore, these batteries are not restricted for shipment by air, sea or ground and are exempted from the hazardous material category. Please ensure that you follow the requirements of DOT, IATA and IMDG to ensure these exceptions remain applicable.**

**Please note that if the RBC or UPS containing the RBC is not shipped in the original packaging or no longer meets any of the referenced requirements prescribed by Special Provision A67 IMDG special provision 238, then the RBC must be shipped as UN2800, Batteries, Wet, Non-spillable, Hazard Class 8, Packing Group II.**





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## SECTION 12: OTHER INFORMATION

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**California Proposition 65:** Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm, and during charging, strong inorganic acid mists containing sulfuric acid are evolved, a chemical Known to the State of California to cause cancer. Wash hands after handling.

**Disposal Considerations:** Refer to the local waste disposal authority for disposal of lead compounds, sulfuric acid and spend soda ash/sodium bicarbonate. Lead-acid batteries are completely recyclable. For information on returning batteries to APC for recycling, contact your APC representative or obtain recycling information on the website ([www.apc.com/recycle/](http://www.apc.com/recycle/)).

**Update to GHS Safety Data Sheet (SDS) format:** This Material Safety Data Sheet is scheduled to be updated to Global Harmonized Standard Safety Data Sheet format by March 1, 2014. Please check [www.APC.com](http://www.APC.com) for versions of this new data sheet.

**Disclaimer:** Every endeavor has been made to ensure that the information contained in this publication is reliable and offered in good faith. It is meant to describe the safety requirements of our products and should not be construed as guaranteeing specific properties. Customers are encouraged to conduct their own tests as end user suitability of the product for particular uses is beyond our control. The information is not intended as an inducement to bargain and no warranty expressed or implied is made as to its accuracy, reliability or completeness. Schneider Electric Incorporated accepts no liability for loss, injury or damage arising from reliance upon the information contained in this data sheet except in conjunction with the proper use of the product to which it refers. Due care should be taken that the use and disposal of this product is in compliance with appropriate Federal, State and Local Government regulations.

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**I. PRODUCT IDENTIFICATION**

**Chemical Trade Name (as used on label):**

Cyclon®, Genesis®, SBS, SBS J, Hawker XE™, Odyssey®, Trolling Thunder™, NexSys™, OptiGrid™ or XFC

**Chemical Family/Classification:**

Sealed Lead Battery

**Synonyms:**

Sealed Lead Acid Battery, VRLA Battery

**Telephone:**

For information and emergencies, contact EnerSys Energy Products Environmental, Health & Safety Dept. at 660-429-2165

**Manufacturer's Name/Address:**

EnerSys Energy Products Inc.  
617 N. Ridgeview Drive  
Warrensburg, MO 64093-9301

**24-Hour Emergency Response Contact:**

CHEMTREC DOMESTIC: 800-424-9300 CHEMTREC INT'L: 703-527-3877

**II. GHS HAZRDS IDENTIFICATION**

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

**GHS LABEL:**

HEALTH	ENVIRONMENTAL	PHYSICAL
		

**Hazard Statements**

**DANGER!**

Causes severe skin burns and eye damage.  
Causes serious eye damage.  
May damage fertility or the unborn child if ingested or inhaled.  
May cause cancer if ingested or inhaled.  
Causes damage to central nervous system, blood and kidneys through prolonged or repeated exposure.  
May form explosive air/gas mixture during charging.  
Extremely flammable gas (hydrogen).  
Explosive, fire, blast, or projection hazard.

**Precautionary Statements**

Wash thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
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.  
Causes skin irritation, serious eye damage.  
Contact with internal components may cause irritation or severe burns. Avoid contact with internal acid.  
Irritating to eyes, respiratory system, and skin.

**III. HAZARDOUS INGREDIENTS/IDENTIFY INFORMATION**

Components	CAS Number	Approximate % by Weight
<b>Inorganic Lead Compound:</b>		
Lead	7439-92-1	45 - 60
Lead Dioxide	1309-60-0	15 - 25
Tin	7440-31-5	0.1 - 0.2
<b>Sulfuric Acid Electrolyte (Sulfuric Acid/Water)</b>	7664-93-9	15 - 20
<b>Case Material:</b>		5 - 10
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	9002-88-4	
Polyphenylene Oxide	25134-01-4	
Polycarbonate/Polyester Alloy	--	
<b>Other:</b>		
Absorbent Glass Mat	--	1 - 2

Inorganic lead and sulfuric acid electrolyte are the primary components of every battery manufactured by EnerSys Energy Products. There are no mercury or cadmium containing products present in batteries manufactured by EnerSys Energy Products.

**IV. FIRST AID MEASURES**

**Inhalation:**  
Sulfuric Acid: Remove to fresh air immediately. If breathing is difficult, give oxygen. Consult a physician  
Lead: Remove from exposure, gargle, wash nose and lips; consult physician.

**Ingestion:**  
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 a physician  
Lead: Consult physician immediately.

**Skin:**  
Sulfuric Acid: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes.  
 If symptoms persist, seek medical attention. Wash contaminated clothing before reuse. Discard contaminated shoes.  
Lead: Wash immediately with soap and water.

**Eyes:**  
Sulfuric Acid and Lead: Flush immediately with large amounts of water for at least 15 minutes while lifting lids  
 Seek immediate medical attention if eyes have been exposed directly to acid.

**V. FIRE FIGHTING MEASURES**

**Flash Point:** N/A      **Flammable Limits:** LEL = 4.1% (Hydrogen Gas)      UEL = 74.2% (Hydrogen Gas)

**Extinguishing Media:** Carbon dioxide; foam; dry chemical. Avoid breathing vapors. Use appropriate media for surrounding fire.

**Special Fire Fighting Procedures:**  
 If batteries are on charge, shut off power. Use positive pressure, self-contained breathing apparatus. Water applied to electrolyte generates heat and causes it to spatter. Wear acid-resistant clothing, gloves, face and eye protection.  
 Note that strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.

**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.

**VI. 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. Do not allow discharge of unneutralized acid to sewer. Acid must be managed in accordance with local, state, and federal requirements.  
 Consult state environmental agency and/or federal EPA.

**VII. HANDLING AND STORAGE**

**Handling:**  
 Unless involved in recycling operations, do not breach the casing or empty the contents of the battery.  
 There may be increasing 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 or stretch wrap to secure items for shipping.

**Storage:**  
 Store batteries in cool, dry, well-ventilated areas with impervious surfaces and adequate containment in the event of spills. Batteries should also be stored under roof for protection against adverse weather conditions. Separate from incompatible materials. Store and handle only in areas with adequate water supply and spill control. Avoid damage to containers. Keep away from fire, sparks and heat. Keep away from metallic objects which 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.

**VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Exposure Limits (mg/m3) Note: N.E.= Not Established**

INGREDIENTS (Chemical/Common Names)	OSHA PEL	ACGIH	US NIOSH	Quebec PEV	Ontario OEL	EU OEL
Lead and Lead Compounds (inorganic)	0.05	0.05	0.05	0.05	0.05	0.15 (b)
Tin	2	2	2	2	2	N.E
Sulfuric Acid Electrolyte	1	0.2	1	1	0.2	0.05 (c)
Polypropylene	N.E	N.E	N.E	N.E	N.E	N.E
Polystyrene	N.E	N.E	N.E	N.E	N.E	N.E
Styrene Acrylonitrile	N.E	N.E	N.E	N.E	N.E	N.E
Acrylonitrile Butadiene						
Styrene	N.E	N.E	N.E	N.E	N.E	N.E
Styrene Butadiene	N.E	N.E	N.E	N.E	N.E	N.E
Polyvinylchloride	N.E	N.E	N.E	N.E	1	N.E
Polycarbonate, Hard Rubber, Polyethylene	N.E	N.E	N.E	N.E	N.E	N.E
Polyphenylene Oxide	N.E	N.E	N.E	N.E	N.E	N.E
Polycarbonate/Polyester Alloy Rubber, Polyethylene	N.E	N.E	N.E	N.E	N.E	N.E
Absorbent Glass Mat	N.E	N.E	N.E	N.E	N.E	N.E

**NOTES:**

(b) As inhalable aerosol

(c) Thoracic fraction

**Engineering Controls (Ventilation):**

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. Handle batteries cautiously to avoid spills. Make certain vent caps are on securely. Avoid contact with internal components. Wear protective clothing, eye and face protection when filling, charging or handling batteries. Do not allow metallic materials to simultaneously contact both the positive and negative terminals of the batteries. Charge the batteries in areas with adequate ventilation. General dilution ventilation is acceptable.

**Respiratory Protection (NIOSH/MSHA approved):**

None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed the 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 apron, clothing and boots.

**Eye Protection:**

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

**Other Protection:**

Under severe exposure emergency conditions, wear acid-resistant clothing and boots.

**IX. PHYSICAL AND CHEMICAL PROPERTIES**

**Properties Listed Below are for Electrolyte:**

<b>Boiling Point:</b>	203 - 240° F	<b>Specific Gravity (H2O = 1):</b>	1.215 to 1.350
<b>Melting Point:</b>	N/A	<b>Vapor Pressure (mm Hg):</b>	10
<b>Solubility in Water:</b>	100%	<b>Vapor Density (AIR = 1):</b>	Greater than 1
<b>Evaporation Rate: (Butyl Acetate = 1)</b>	Less than 1	<b>% Volatile by Weight:</b>	N/A
<b>pH:</b>	~1 to 2	<b>Flash Point:</b>	Below room temperature (as hydrogen gas)
<b>LEL (Lower Explosive Limit)</b>	4.1% (Hydrogen)	<b>UEL (Upper Explosive Limit)</b>	74.2% (Hydrogen)
<b>Appearance and Odor:</b>	Manufactured article; no apparent odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.		

**X. REACTIVITY DATA**

**Stability:** Stable X Unstable     

**This product is stable under normal conditions at ambient temperature.**

**Conditions To Avoid:** Prolonged overcharge; sources of ignition

**Incompatibility: (Materials to avoid)**

Sulfuric Acid: 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.

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

**Hazardous Decomposition Products:**

Sulfuric Acid: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, and hydrogen sulfide.

Lead Compounds: High temperatures 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.

**Hazardous Polymerization:**

Will not occur

**XI. TOXICOLOGICAL INFORMATION**

**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. The presence of nascent hydrogen may generate highly toxic arsine gas.

**Inhalation:**

Sulfuric Acid: Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.

Lead Compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

**Ingestion:**

Sulfuric Acid: May cause severe irritation of mouth, throat, esophagus and stomach.

Lead Compounds: 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 physician.

**Skin Contact:**

Sulfuric Acid: Severe irritation, burns and ulceration.

Lead Compounds: Not absorbed through the skin.

**Eye Contact:**

Sulfuric Acid: Severe irritation, burns, cornea damage, and blindness.

Lead Components: May cause eye irritation.

**Effects of Overexposure - Acute:**

Sulfuric Acid: Severe skin irritation, damage to cornea, upper respiratory irritation.

Lead Compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscle aches and weakness, sleep disturbances and irritability.

**Effects of Overexposure - Chronic:**

Sulfuric Acid: Possible erosion of tooth enamel, inflammation of nose, throat and bronchial tubes.

Lead Compounds: 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 50mcg/100 ml or higher. Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues.

**Carcinogenicity:**

Sulfuric Acid: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Group 1 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.

Lead Compounds: Lead is listed as a Group 2A carcinogen, likely in animals at extreme doses. Per the guidance found in OSHA 29 CFR 1910.1200 Appendix F, this is approximately equivalent to GHS Category 1B. Proof of carcinogenicity in humans is lacking at present.

**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 diseases such as eczema and contact dermatitis. Lead and its compounds can aggravate some forms of kidney, liver and neurologic diseases.

**Acute Toxicity:**

Inhalation LD50:

Electrolyte: LC50 rat: 375 mg/m<sup>3</sup>; LC50: guinea pig: 510 mg/m<sup>3</sup>

Elemental Lead: Acute Toxicity Point Estimate = 4500 ppmV (based on lead bullion)

**Oral LD50:**

Electrolyte: rat: 2140 mg/kg

Elemental lead: Acute Toxicity Estimate (ATE) = 500 mg/kg body weight (based on lead bullion)

**Additional Health Data:**

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 ingestion: wash hands, face, neck and arms thoroughly before eating, smoking or leaving the worksite. 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 only and should be isolated from children and their environment.

The 19<sup>th</sup> Amendment to EC Directive 67/548/EEC classified lead compounds, but not lead in metal form, as possibly toxic to reproduction.

Risk phrase 61: May cause harm to the unborn child, applies to lead compounds, especially soluble forms.

**XII. ECOLOGICAL INFORMATION**

**Environmental Fate:**

Lead is very persistent in soil and sediments. No data on environmental degradation. 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.

**Environmental Toxicity:** Aquatic Toxicity:

Sulfuric acid: 24-hr LC50, freshwater fish (Brachydanio rerio): 82 mg/L

96 hr- LOEC, freshwater fish (Cyprinus carpio): 22 mg/L

Lead: 48 hr LC50 (modeled for aquatic invertebrates): <1 mg/L, based on lead bullion

**Additional Information:**

- No known effects on stratospheric ozone depletion.
- Volatile organic compounds: 0% (by Volume)
- Water Endangering Class (WGK): NA

**XIII. DISPOSAL CONSIDERATIONS (UNITED STATES)**

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. This should be managed in accordance with approved local, state and federal requirements. Consult state environmental agency and/or federal EPA.

Electrolyte:

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.

Following local, State/Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end-user.

**XIV. TRANSPORT INFORMATION**

**U.S. DOT:**

Exempted from the hazardous materials regulations (HMR) because the batteries meet the requirements of 49 CFR 173.159(f) and 49 CFR 173.159a of the U.S. Department of Transportation's HMR. Battery and outer package must be marked "NONSPILLABLE" or "NONSPILLABLE BATTERY" Battery terminals must be protected against short circuits.

**IATA Dangerous Goods Regulations DGR:**

Exempted from the dangerous goods regulations because the batteries meet the requirements of Packing Instruction 872 and Special Provisions A67 of the International Air Transportation Association (IATA) Dangerous goods Regulations and International Civil Aviation Organization (ICAO) Technical Instructions. Battery Terminals must be protected against short circuits.

The words "NOT RESTRICTED", SPECIAL PROVISION A67" must be provided when the air waybill is issued.

**IMDG:**

Exempted from the dangerous goods regulations for transport by sea because the batteries meet the requirements of Special Provision 238 of the International Maritime Dangerous Goods( IMDG CODE). Battery terminals must be protected against short circuits.

**Requirements for Safe Shipping and Handling of Cyclon Cells:**

Warning – Electrical Fire Hazard – Protect against shorting. Terminals can short and cause a fire if not insulated during shipping. Cyclon product must be labeled "NONSPILLABLE" during shipping. Follow all federal shipping regulations. See section IX of this sheet and CFR 49 Parts 171 through 180, available online at [www.gpoaccess.gov](http://www.gpoaccess.gov).

**Requirements for Shipping Cyclon Product as Single Cells:**

Protective caps or other durable inert material must be used to insulate each terminal of each cell unless cells are shipping in the original packaging from EnerSys, in full box quantities. Protective caps are available for all cell sizes by contacting EnerSys Customer Service at 1-800-964-2837.

**Requirements for Shipping Cyclon Product Assembled Into Multicell Batteries:**

Assembled batteries must have short circuit protection during shipping. Exposed terminals, connectors, or lead wires must be insulated with a durable inert material to prevent exposure during shipping.

**XV. REGULATORY INFORMATION**

**UNITED STATES:**

**EPA SARA Title III:**

**Section 302 EPCRA Extremely Hazardous Substances (EHS):**

Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA, with a Threshold Planning Quantity (TPQ) of 1,000 lbs. EPCRA Section 302 notification is required if 1000 lbs or more of sulfuric acid is present at one site (40 CFR 370.10). For more information consult 40 CFR Part 355. The quantity of sulfuric acid will vary by battery type. Contact your EnerSys representative for additional information.

**Section 304 CERCLA Hazardous Substances:**

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

**Section 311/312 Hazard Categorization:**

EPCRA Section 312 Tier Two reporting is required for non-automotive 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. For more information consult 40 CFR 370.10 and 40 CFR 370.40.

**Section 313 EPCRA Toxic Substances:**

40 CFR section 372.38 (b) states: If a toxic chemical is present in an article at a covered facility, a person is not required to consider the quantity of the toxic chemical present in such article when determining whether an applicable threshold has been met under § 372.25, § 372.27, or § 372.28 or determining the amount of release to be reported under § 372.30. This exemption applies whether the person received the article from another person or the person produced the article. However, this exemption applies only to the quantity of the toxic chemical present in the article.

**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>Toxic Chemical</u>	<u>CAS Number</u>	<u>Approximate % by Wt.</u>
Lead	7439-92-1	45 - 60
Sulfuric Acid Electrolyte (Sulfuric Acid/Water)	7664-93-9	15 - 20
Tin	7440-31-5	0.1 - 0.2

See 40 CFR Part 370 for more details.

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:**

TSCA Section 8b – Inventory Status: All chemicals comprising this product are either exempt or listed on the TSCA Inventory.

TSCA Section 12b (40 CFR Part 707.60(b)) No notice of export will be required for articles, except PCB articles, unless the Agency so requires in the context of individual section 5, 6, or 7 actions.

TSCA Section 13 (40 CFR Part 707.20): No import certification required (EPA 305-B-99-001, June 1999, Introduction to the Chemical Import Requirements of the Toxic Substances Control Act, Section IV.A).

**RCRA:**

Spent Lead Acid Batteries are subject to streamlined handling requirements when managed in compliance with 40 CFR section 266.80 or 40 CFR part 273. Waste sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).

**CAA:**

EnerSys 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, EnerSys established a policy to eliminate the use of Class I ODC's prior to the May 15, 1993 deadline.

**STATE REGULATIONS (US):**

**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. Batteries also contain other chemicals known to the State of California to cause cancer. Wash hands after handling.

**INTERNATIONAL REGULATIONS:**

Distribution into Quebec to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2).

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

**XVI. OTHER INFORMATION**

Revised: 05/14/2015

**NFPA Hazard Rating for Sulfuric Acid:**

Flammability (Red) = 0

Health (Blue) = 3

Reactivity (Yellow) = 2

Sulfuric acid is water-reactive if concentrated.