

MATERIAL SAFETY DATA SHEET

1. Chemical Product and Company Identification

Chemical product identification

Product name: KiloVault 2V 1000Ah (AGM Battery)
Manufacturer: KiloVault LLC
Address: 330 Codman Hill Road, Boxborough, MA, 01719
Tel: +1 (888) 218-5924
Fax: +1 (978) 562-5854

2. Hazards Identification

Emergency Overview

Under normal conditions of battery use, internal components will not present a health hazard. The following information is provided for battery acid and lead exposure that may occur during battery production or container breakage or under extreme heat conditions such as fire.

In case of rupture: Corrosive - The product causes burns of eyes, skin and mucous membranes.




Appearance: No information available.

Physical State: Solid.

Odor: Odorless

Health		Environmental		Physical	
	Category	Aquatic	Chronic 1	Explosive Chemical	Division 1.3
Acute Toxicity (Oral/Dermal/Inhalation)	4	Aquatic	Acute 1		
Skin Corrosion/Irritation	1A				
Eye Damage	1				
Reproductive	1A				
Carcinogenicity (lead)	2A				
Carcinogenicity (acid mist)	1A				
Specific Target Organ Toxicity (Repeated exposure)	1A				

Label Elements:

Health	Environmental	Physical
		

<p>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.</p>	<p>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.</p>
---	---

Potential Health Effects:

Primary routes of exposure: Skin contact.

Acute Toxicity

Eyes: Corrosive to the eyes and may cause severe damage including blindness.

Skin: Causes burns.

Inhalation: Harmful by inhalation. Contact with moist mucous membranes of the respiratory system can cause caustic conditions resulting in burns.

Ingestion: Harmful if swallowed. Can burn the mouth, throat, and stomach.

Chronic Effects: Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Avoid repeated exposure.

Main Symptoms: Severe exposures can lead to shock, circulatory collapse, and death. Lead poisoning is characterized by a metallic taste in the mouth, loss of appetite, indigestion, nausea, vomiting, constipation, sleep disturbances and overall weakness.

Aggravated Medical Conditions: None known.

Environment Hazard: See section 12 for additional.

3. Composition, Information on Ingredients

Chemical Name	Composition (in % by weight)	CAS Number
Lead	65~75	7439-92-1
Sulfuric acid	10~20	7664-93-9
ABS resin	~5	9003-56-9
Tin	<0.5	7440-31-5
Calcium	<0.1	7440-70-2

4. First Aid Measures

General Advice:

First aid is upon the rupture of a sealed battery.

Eye Contact:

Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub the affected area.

Skin Contact: Immediate medical attention is required. Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.

Inhalation: Move to fresh air. Call a physician or Poison Control Center immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Ingestion: Immediate medical attention is required. Call a physician or Poison Control Center immediately. Do NOT induce vomiting. Drink plenty of water. Never give anything by mouth to an unconscious person. Remove from exposure, lie down.

Notes to Physician: Treat symptomatically.

Protection of First-aiders: Use personal protective equipment. Avoid contact with skin, eyes and clothing.

5. Fire Fighting Measures

Flash Point Temperature: Hydrogen: 259 °C

Auto Ignition Temperature: Hydrogen: 580 °C

Flammable Limits: LEL = 4.1% (Hydrogen Gas in air) ; UEL = 74.2%

Suitable Extinguishing Media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Uniform Fire Code: Corrosive: Acid-Liquid

Hazardous Combustion Products: Hazardous metal fumes and oxides.

Explosion Data Sensitivity to Mechanical Impact: No.

Sensitivity to Static Discharge: No.

Specific Hazards Arising from the Chemical: The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gasses and vapors. In the event of fire and/or explosion do not breathe fumes.

Protective Equipment and Precautions for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA - Health Hazard 3 - Flammability 0 - Stability 2 - Physical and Chemical Hazards

6. Accidental Release Measures

Personal Precautions: Use personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not get in eyes, on skin, or on clothing.

Environmental Precautions: Refer to protective measures listed in Sections 7 and 8.

Methods for Containment: Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up: In case of rupture: Use personal protective equipment. Dam up. Soak up with inert absorbent material. Take up mechanically and collect in a suitable container for disposal. Clean contaminated surface thoroughly.

Other Information: Refer to protective measures listed in Sections 7 and 8.

7. Handling and Storage

Handling: Handle in accordance with good industrial hygiene and safety practice.

Storage: Keep containers tightly closed in a dry, cool and well-ventilated place.

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 may generate and release flammable hydrogen gas. Charging space should be ventilated. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

Other: Follow Manufacturers Recommendations regarding maximum recommended currents and operating temperature range. Do not overcharge beyond the recommended upper charging voltage limit. Applying pressure or deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

8. Exposure Controls and Personal Protection

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Lead 7439-92-1	TWA: 0.05 mg/m ³	TWA: 50 µg/m ³ Action Level: 30 µg/m ³ Poison, See 29 CFR 1910.1025	IDLH: 100 mg/m ³ TWA: 0.050 mg/m ³
Sulfuric acid 7664-93-9	TWA: 0.2 mg/m ³ thoracic fraction	TWA: 1 mg/m ³ (vacated) TWA: 1 mg/m ³	IDLH: 15 mg/m ³ TWA: 1 mg/m ³
Tin 7440-31-5	TWA: 2 mg/m ³	TWA: 2 mg/m ³ Sn except oxides (vacated) TWA: 2 mg/m ³	IDLH: 100 mg/m ³ TWA: 2 mg/m ³

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value.

OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits.

NIOSH IDLH: Immediately Dangerous to Life or Health.

Other Exposure Guidelines: Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir. , 1992).

Engineering Measures: Showers, Eyewash Stations, Ventilation Systems

Personal Protective Equipment:

Eye/Face Protection: Tightly fitting safety goggles.

Skin and Body Protection: Wear protective gloves/clothing.

Respiratory Protection: No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

Appearance And Odor: Manufactured article; no apparent odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.

Odor Threshold: Not Applicable.

Ph: Not Applicable.

Boiling Point: Not applicable unless individual components are exposed.

Battery Electrolyte (Acid): 230-233.6 ° F (110 112 ° C)

Lead: 3191 °F (1755 °C)

Melting Point: Lead - 621.32 °F (327.4 °C)

Specific Gravity (H₂O = 1): 1.215 to 1.350

Flash Point: 498.2 °F (259.0 °C) Hydrogen

Evaporation Rate (Butyl Acetate = 1): <1

Vapor Pressure (mm Hg @ 20° C): Battery Electrolyte (Acid) 11.7

Flammability - Upper/Lower Flammability Or Explosive Limits: Hydrogen Flammability Limit Lower - 4.1%, Hydrogen Flammability Upper Limit - 72.4%

Vapor Pressure: Not Applicable

Vapor Density: 3.4 (Air = 1) Battery Electrolyte (Acid)

Relative Density: 1.21 - 1.3 Battery Electrolyte (Acid)

Solubility: Lead and Lead dioxide are not soluble. 100% Battery Electrolyte (Acid).

% Volatile By Weight: Not applicable unless individual components are exposed.

Partition Coefficient (N-Octanol/Water): Not Applicable.

Auto-Ignition Temperature: 1076 °F (580 °C) Hydrogen.

10. Stability and Reactivity

Stability: Stable under recommended storage conditions.

Incompatible Products: Incompatible with strong acids and bases. Incompatible with oxidizing agents.

Conditions to Avoid: Exposure to air or moisture over prolonged periods.

Hazardous Decomposition Products: Thermal decomposition can lead to release of toxic/corrosive gasses and vapors

Hazardous Polymerization: Hazardous polymerization does not occur.

11. Toxicological Information

Acute Toxicity

Product Information: Product does not present an acute toxicity hazard based on known or supplied information.

Irritation: Causes severe irritation and or burns.

Component Information:

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Sulfuric Acid	= 2140 mg/kg (Rat)	-	= 510 mg/m3(Rat) 2 h

Chronic Toxicity: Lead compounds may be absorbed by ingestion, by inhalation and through the skin. Lead may damage kidney function, the blood forming system and the reproductive system. Avoid repeated exposure.

Carcinogenicity: The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Lead	A3	Group 2A	Reasonably Anticipated	X
Sulfuric Acid	A2	Group 1	Known	X
ABS Resin		Group 3		

ACGIH: (American Conference of Governmental Industrial Hygienists)

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

IARC: (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 3 - The agent (mixture) is unclassifiable as to carcinogenicity in humans.

NTP: (National Toxicity Program)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

OSHA: (Occupational Safety & Health Administration)

X -Present

Reproductive Toxicity: Product is or contains a chemical which is a known or suspected reproductive hazard.

Developmental Toxicity: Contains ingredients that have suspected developmental hazards. Inorganic lead compounds can cause developmental damage.

Target Organ Effects: None Known

12. Ecological Information

Ecotoxicity: The environmental impact of this product has not been fully investigated

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Lead		LC50: 0.44 mg/L (96 h semi-static) Cyprinus carpio LC50: 1.17 mg/L (96 h flow-through) Oncorhynchus mykiss LC50: 1.32 mg/L (96 h static) Oncorhynchus mykiss		EC50: 600 µg/L (48 h) water flea
Sulfuric Acid		LC50: > 500 mg/L (96 h static) Brachydanio rerio		EC50: 29 mg/L (24 h) Daphnia magna

13. Disposal Considerations

Waste Disposal Methods: This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261). Should not be released into the environment.

Contaminated Packaging: Do not re-use empty containers.

US EPA Waste Number: D002 D008

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Lead - 7439-92-1	(hazardous constituent - no waste number)	Included in waste streams: F035, F037, F038, F039, K002, K003, K005, K046, K048, K049, K051, K052, K061, K062, K064, K065, K066, K069, K086, K100, K176	= 5.0 mg/L regulatory level	

California Hazardous Waste Codes: 792

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California EHW	California Carc	California Hazardous Wastes	California Waste - Part 2
Lead			Toxic	TCLP (for CA Toxicity): 5.0 mg/L
Sulfuric Acid			Toxic Corrosive	
Calcium	Ignitable Reactive			

14. Transport Information

Note: Transportation requirements do not apply once the battery pack has been installed in a vehicle as part of the vehicle's functional components.

Transportation: Sealed Lead Acid / OPTIMA Battery is not a DOT Hazardous Material

Other: Per DOT, IATA, ICAO, and IMDG rules and regulations, these batteries are exempt from "UN2800" classification as a result of successful completion of the following tests:

- 1.) Vibration tests
- 2.) Pressure Differential Tests
- 3.) Case Rupturing Tests (no free liquids)

United States DOT: Not regulated as dangerous goods per 49 CFR 173.159d

IATA: Not regulated as dangerous goods per Special Provision A67

IMDG: Not regulated as dangerous goods per exception 238

15. Regulatory Information

International Inventories

TSCA: Complies

DSL: Not determined

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) . This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Lead	7439-92-1	65~75	0.1
Sulfuric Acid	7664-93-9	10~20	1.0

SARA 311/312 Hazard Categories Acute Health Hazard: Yes

Chronic Health Hazard: Yes

Fire Hazard: No

Sudden Release of Pressure Hazard: No

Reactive Hazard: No



Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Lead		X	X	
Sulfuric Acid	1000 lb			X

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following substances which are listed hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act:

Chemical Name	CAS-No	Weight %	HAPS Data	VOC Chemicals	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Lead	7439-92-1	65~75				

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs
Lead	10 lb	
Sulfuric Acid	1000 lb	1000 lb

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Lead	7439-92-1	Carcinogen Developmental Female Reproductive Male Reproductive
Sulfuric Acid	7664-93-9	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Lead	X	X	X	X	X
Tin	X	X	X		
Calcium	X	X	X		
Sulfuric Acid	X	X	X	X	X

International Regulations

Mexico - Grade: Minimum risk, Grade 0

Chemical Name	Carcinogen Status	Exposure Limits
Lead	A3	Mexico: TWA= 0.15 mg/m ³
Tin		Mexico: TWA 2 mg/m ³ Mexico: STEL 4 mg/m ³
Sulfuric Acid	A2	Mexico: TWA 1 mg/m ³

Canada

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

WHMIS Hazard Class

D2A Very toxic materials E Corrosive material



Chemical Name	NRPI
Lead	X
Sulfuric Acid	X

Legend

NRPI - National Pollutant Release Inventory

16. Additional Information

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.