

# MSDS (Material Safety Data Sheet)

Updated: 2020/12/25      Valid Date: 2021/01/01

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

<b>1.1 Product Identifier</b>	
Trade name/designation:	Valve Regulated Lead Acid Battery
<b>1.2 Relevant identified uses of the substance or mixture and uses advised against</b>	
Relevant identified uses:	Rechargeable Storage Batteries
<b>1.3 Details of the supplier</b>	
Manufacturers Name:	Guangdong Kstar industrial Science &Technology Co., Ltd.
Website:	http://www.kstar.com.cn
Relevant identified uses:	Rechargeable Storage Batteries
Information contact:	Zhongkai High-tech Zone, Huizhou City, HeChang 7 Road on the 3rd
<b>1.4 Emergency Telephone Number</b>	
Contact number:	Tel: (86-752)5751688 Fax : (86-752)5751688 -6150

## SECTION 2: Hazards identification

<b>Section2: Hazards identification</b>	
<b>2.1 Classification of the substance or mixture</b>	
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	
<p>Material is an article. No health effects are expected during normal use of this product as sold. Hazardous exposure may occur when the product is heated, oxidized or otherwise processed, damaged or subjected to misuse. Follow manufacturer's instructions for installation, service and use. No hazards occur during the normal operation of a Lead Acid Battery as it is described in the instructions for use that are provided with the Battery. Lead acid Batteries have three significant characteristics:</p> <ul style="list-style-type: none"> <li>. They contain an electrolyte which contains diluted sulphuric acid. Sulphuric acid may cause severe chemical burns.</li> <li>. During the charging process or during operation they might develop hydrogen gas and oxygen, which under certain circumstances may result in an explosive mixture.</li> <li>. They can contain a considerable amount of energy, which may be a source of high electrical current and a severe electrical shock in the event of a short circuit. Note: The Batteries have to be marked with the symbols listed under section15.</li> </ul>	
<b>2.2 Other hazards</b>	
Adverse human health effects and symptoms:	
<b>Acute</b>	<b>Chronic</b>

<b>Inhalation</b>	Under normal conditions of use, no health effects are expected. Contents of an open battery can cause respiratory irritation.	Repeated and prolonged exposure may cause irritation.
<b>Skin</b>	Under normal conditions of use, no health effects are expected.	No data available
<b>Eye</b>	Under normal conditions of use, no health effects are expected. Exposure to dust may cause irritation.	No data available.
<b>Ingestion</b>	Under normal conditions of use, no health effects are expected. Lead ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping.	No data available
<b>HMIS Rating for Sulfuric Acid:</b>	Health: 3 Flammability: 0 Reactivity: 2 Other: 0	Rating Codes: 0 = Insignificant, 1 = Slight, 2 = Moderate 3 = High 4 = Extreme
<b>NFPA Rating for Sulfuric Acid:</b>	Health: 3 Flammability: 0 Reactivity: 2 Other: 0	

### SECTION 3: Composition, information or Ingredients <sup>3)</sup>

Material	CAS No	EC No	OSHA PEL	ACGIH TLV	<sup>1</sup> By Weight%	Classification according to CLP(1272/2008)
<i>Specific Chemical Identity:</i> <b>LEAD</b> <i>Common Name:</i> <b>GRID</b>	7439-92-1	231-100-4	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	~57%	<sup>2</sup> T,R60, R61,S1, S2, S13, S35, S45, S53,
<i>Specific Chemical Identity:</i> <b>Lead Dioxide</b> <i>Common Name:</i> <b>Lead Oxide</b>	1309-60-0	215-174-5	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>	~ 22%	<sup>2</sup> T,R20/22, R33, R50/R53, R61, S53, S45, S60, S61
<i>Specific Chemical Identity:</i> <b>Sulfuric Acid</b> <i>Common Name:</i> <sup>4</sup> <b>Battery Electrolyte (Acid)</b>	7664-93-9	231-639-5	1mg/m <sup>3</sup>	1.0 mg/m <sup>3</sup>	~14%	C; R35; S1/2, S26, S30, S45
<sup>5</sup> <b>Plastic Container/Plastic Parts</b>	--				~7%	--

1) Contents may vary due to performance data of the Battery

2) As result of the harm to the unborn children Lead compounds are classified as toxic for reproduction, Category 1. As this category is not described with a specific hazard symbol, Lead compounds have to be labeled with the „skull“ symbol. Lead compounds are not classified „toxic“. 3) See Section 12 – Ecological Information

4) Density of the electrolyte varies in accordance to the state of charge

5) Composition of the plastic may vary due to different customer requirements

### SECTION 4: First Aid Measures

#### 4.1 Description of first aid measures:

Electrolyte (diluted sulphuric acid): sulphuric acid acts corrosively and damages skin Lead compounds: lead compounds

are classified as toxic for reproduction (if swallowed)

#### 4.1.1 Electrolyte (Sulphuric acid)

<b>after skin contact:</b>	rinse with water, remove and wash wetted clothing
<b>after inhalation of acid mist:</b>	inhale fresh air, seek advice of a medical doctor
<b>after contact with the eyes:</b>	rinse under running water for several minutes, seek advice of a medical doctor
<b>after swallowing:</b>	drink lot of water immediately, swallow activated carbon, do not induce vomiting, seek advice of a medical doctor

#### 4.1.2 Lead compounds

<b>after skin contact:</b>	clean with water and soap
<b>after inhalation:</b>	inhale fresh air, seek advice of a medical doctor
<b>after contact with the eyes:</b>	rinse under running water for several minutes, seek advice of a medical doctor
<b>after swallowing:</b>	wash mouth with water, seek advice of a medical doctor

## SECTION 5: FireFighting Measures

<b>Unusual Fire and Explosion Hazards:</b>	Hydrogen and Oxygen gases are produced in cells during normal battery operation and expel into air through vent caps.
<b>Suitable fire extinguishing agents:</b>	CO2 or dry powder extinguishing agents
<b>Unsuitable fire extinguishing agents:</b>	Water, if the battery voltage is above 120 V
<b>Special protective equipment:</b>	Protective goggles, respiratory protective equipment, acid protective equipment, acid proof clothing in case of larger stationary battery plants or where larger quantities are stored.
<b>Special Firefighter Procedures</b>	Use Positive Pressure, self-contained breathing apparatus.

Note: Hydrogen Flash point: -259°C. Hydrogen Auto ignition point: 580°C Hydrogen Flammable Limits in Air (% by Volume): Lower Explosion Limit (LEL) : 4.1 ; Upper Explosion Limit (UEL) : 74.2

## SECTION 6: Accidental Release Measures

<b>6.1 Personal precautions, protective equipment and emergency procedures</b>	
Eye Protection	Chemical goggles, safety glasses with side shields and or a full-face shield.
Protective gloves	Rubber, PVC or neoprene
Respiratory Protection	NIOSH approved acid mist/organic vapor respirator, if OSHA PEL is exceeded.
Other Protective Equipment	Acid resistant apron or clothes.

Note: Personal Protective Equipment advice is contained in Section 8 of the SDS.

**6.2 Environmental precautions.**

Prevent entry into waterways, sewers, basements or confined areas. Runoff from fire control and dilution water may be toxic and corrosive and may cause adverse environmental impacts.

**6.3 Methods and materials for containment and cleaning up.**

6.3.1 For Containment	In the event of a battery rupturing; stop the leak if you can do it without risk. Absorb with earth, sand or other non-combustible material. Cautiously neutralize spilled liquid.
6.3.2 For Cleaning up	Dispose of in accordance with local, State, and national regulations.

**SECTION 7: Handling and Storage**

**7.1 Precautions for safe handling**

**Handling:** Keep away from heat and sources of ignition. Wash hands thoroughly after use. Do not use organic solvents; use only manufacturer recommended cleaners on the batteries. Avoid sparks. Do not remove vent caps. Do not double stack industrial batteries, it may cause damage.

**Storage:** Store batteries in a cool, dry area. Store batteries in a covered area that protects against adverse weather conditions. Protect batteries from coming into contact with conductive materials to prevent fire or battery failures. Don't store or charge batteries in temperatures under -40 F (-20o C). Keep away from fire, sparks and heat sources. Protect from damage to prevent possible leaks or spills. It is imperative that these instructions be followed if the batteries are being stored.

**SECTION 8: Exposure Controls and Personal Protection**

**8.1 Appropriate engineering controls**

Store batteries with adequate ventilation. Room ventilation is also required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.

Substance name	EC-No.	CAS-No	Description
Lead	231-100-4	7439-92-1	No exposure to lead and lead containing battery paste during normal conditions of use. R-phrases: R35 causes severe chemical burns
Sulfuric Acid	231-639-5	7664-93-9	S-phrases: S2:Keep out of reach of children S16:Keep away from sparks or naked flame, No smoking S26:In case of contact with eyes rinse immediately with plenty of water and seek medical advice S45:In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).

**8.2 Individual protection measures**

**Personal Protective Equipment:**

During installation under normal conditions there is no exposure to lead or sulphuric acid. In the event of battery breakage, exposure to sulphuric acid and lead may occur. During high rate charges or overcharging acid mist may occur.

<b>Eye/Face Protection:</b>	Chemical goggles, safety glasses with side shields and or a full-face shield.
<b>Protective gloves:</b>	Rubber, PVC or neoprene
<b>Respiratory Protection:</b>	NIOSH approved acid mist/organic vapor respirator, if OSHA PEL is exceeded.
<b>Other Protective Equipment:</b>	Acid resistant apron or clothes.

**Work Practices:**

Use standard lead-acid battery practices. Do not wear metallic jewelry when working with batteries. Use non-conductive tools only. Discharge static electricity prior to working on a battery. Maintain eyewash, fire extinguisher and emergency communication device in the work area.

## SECTION 9: Physical and Chemical Properties

Item	Lead and lead compounds	Electrolyte
<b>Appearance</b>	<b>Form:</b>	Solid
	<b>Color:</b>	Grey
	<b>Odor:</b>	Odorless
<b>PH</b>	N/A	
<b>Melting point/freezing point.</b>	327.4 °C(melting point)	-35 to -60 °C
<b>Initial boiling point and boiling range.</b>	1740 °C(lit.)	Approx. 108~114°C
<b>Flash point.</b>	N/A	
<b>Evaporation rate.</b>	N/A	
<b>Vapor pressure. (mm Hg at 20°C)</b>	N.A.	< 0.3 mmHg
<b>Vapor density.(Air=1)</b>	7.1	3.4
<b>Density(20°C)</b>	11.35 g/cm <sup>3</sup>	1.2 to 1.3 g/cm <sup>3</sup>
<b>solubility in water :</b>	Very low (0.15mg/l)	Fully soluble
<b>Partition coefficient: n-octanol/water.</b>	N/A	
<b>Decomposition temperature.</b>	N/A	
<i>Lead and Lead compounds used in Lead Acid batteries are poorly soluble in water; Lead can be dissolved in an acidic or alkaline environment only</i>		

## SECTION 10: Stability and Reactivity

<b>10.1 Reactivity:</b>	Broken batteries may result in small amounts of spilled electrolyte. Electrolyte is a corrosive, nonflammable liquid. Electrolyte can destroy organic materials such as cardboard, wood, textiles. Electrolyte may produce hydrogen as a reaction with some metals.
<b>10.2 Chemical Stability:</b>	The battery and contents are stable under normal conditions.
<b>10.3 Possibility of hazardous reactions:</b>	Hazardous polymerization will not occur.
<b>10.4 Conditions to avoid:</b>	Overheating or overcharging the battery may results in acid mist and hydrogen generation.
<b>10.5 Incompatibility (materials to avoid):</b>	Strong alkaline materials, conductive metals, organic solvents, spark or open flame.
<b>10.6 Hazardous decomposition products:</b>	Hydrogen gas may be generated in an overcharged condition, in fire or at very high temperatures. In fire, may emit CO, CO2 and Sulfur Oxides.

## SECTION 11: Toxicological Information

**11.1 Information on toxicological effects:**

KSTAR VRLA batteries are sealed, recombinant design that require no water replacement throughout their service life, thus no contact is made with the battery's internal components or chemical hazards. Under normal use and handling, these batteries do not emit regulated or hazardous substances.

Sulfuric Acid (7664-93-9)

Administration Route	Method	Dose	Test Animal
Acute oral toxicity	LD50	2140 mg/kg	Rat
Acute inhalative toxicity (vapor)	LC50	510 mg/m3	Rat

**11.2 Routes of exposure:**

	Acute	Chronic
Inhalation	Under normal conditions of use, no health effects are expected. Contents of an open battery can cause respiratory irritation.	Repeated and prolonged exposure may cause irritation.
Skin	Under normal conditions of use, no health effects are expected.	No data available
Eye	Under normal conditions of use, no health effects are expected. Exposure to dust may cause irritation.	No data available.
Ingestion	Under normal conditions of use, no health effects are expected. Lead ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping.	No data available

**Carcinogenicity:** The International Agency on Cancer (IARCC) has classified "strong inorganic acid mists containing sulfuric acid" as a category 1 carcinogen (inhalation), a substance that is carcinogenic to humans. This classification does not apply to the liquid forms of sulfuric acid contained within the battery. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist at high levels.

**SECTION 12: Ecological Information**

***This information is of relevance if the battery is broken and the ingredients are released to environment.***

**12.1 Electrolyte (diluted sulphuric acid)** In order to avoid damage to the sewage system, the acid has to be neutralized by means of time or sodium carbonate before disposal. Ecological damage is possible by change of pH. The electrolyte solution reacts with water and organic substances, causing damage to flora and fauna. The electrolyte may also contain soluble components of lead that can be toxic to aquatic environments.

**12.2 Lead and Lead compounds** Chemical and physical treatment is required for the elimination from water. Waste water containing lead must not be disposed of in an untreated condition. The former classification of Lead compounds as toxic for the aquatic environment R50/53 had been triggered from test results generated in the 80's for soluble Lead compounds (Lead Acetate). The hardly soluble Lead compounds such as Battery Lead Oxide were not tested at this time. Tests on Battery Lead Oxide were carried out in 2001 and 2005. The respective test results conclude that Battery Lead Oxide is not toxic for the environment, neither R50 nor R50/53 nor R51/53. From this it follows that the general

classification for Lead compounds (R50/53) does not apply to Battery Lead Oxide. As the result of this the Risk Phrase R52/53 (Harmful to aquatic organisms, may cause longterm adverse effects in the aquatic environment) applies to Battery Lead Oxide.

Effects of Battery Lead Oxide in the aquatic environment:

Toxicity for fish: 96 h LC 50 > 100 mg/l

Toxicity for daphnia: 48 h EC 50 > 100 mg/l

Toxicity for alga: 72 h IC 50 > 10 mg/l

The results demonstrate these Battery Lead Oxide compounds in a concentration of 100 mg/l have no adverse effect on fish and daphnia. A concentration of these Battery Lead Oxide of 10 mg/l has no adverse effect on the rate of growth and the biomass. For the classification according to Directive 67/548/EEC the most sensitive adverse effect has to be considered. As a result of the toxicity for alga at > 10 mg/l Battery Lead Oxide has to be classified according to the R-Phrases 52/53 (Harmful to aquatic organisms, may cause long term adverse effects in the aquatic environment).

## SECTION 13: Disposal Considerations

Spent lead acid batteries (EWC 160601) are subject to regulation of the EU Battery Directive and its adoptions into national legislation on the composition and end of life management of batteries. Spent Lead Acid batteries are recycled in lead refineries (secondary lead smelters). The components of a spent Lead Acid battery are recycled or reprocessed. At the points of sale, the manufacturers and importers of batteries, respectively the metal dealers take back spent batteries, and render them to the secondary lead smelters for processing. To simplify the collection and recycling or reprocessing process spent Lead Acid batteries must not be mixed with other batteries. By no means may the electrolyte (diluted sulphuric acid) be emptied in an inexpert manner. This process is to be carried out by the processing companies only.

## SECTION 14: Transport Information

All **KSTAR** batteries are identified as "Battery, Electric Storage, Wet, Nonspillable" when transported by air, sea or by land transportation. The battery(s) must be identified as above on the Bill of Lading and properly packaged with their terminals protected from short circuit. **NA or UN numbers do not apply.** **KSTAR** battery(s) warning label identifies each battery as **NONSPILLABLE**.

**KSTAR** seal lead-acid batteries are classified as "Nonspillable" for the purpose of transportation by DOT, and IATA/ICAO as result of passing the Vibration and Pressure Differential Test described in **DOT [49 CFR 173.159 (f)]** and **IATA/ICAO [Special Provision A67]**. **KSTAR** seal lead-acid batteries can be safely transported on deck, or under deck stored on either a passenger or cargo vessel as result of passing the Vibration and Pressure Differential Tests as described in the IMDG regulations(Special Article 238).

To transport these batteries as "non-spillable" they must be shipped in a condition that would protect them from short-circuits and be securely packaged so as to withstand conditions normal to transportation by a consumer, in or out of a device, they are unregulated thus requiring no additional special handling or packaging.

For all modes of transportation, each battery and outer package is labeled "**NON-SPILLABLE**" per **49 CFR 173.159(f)** and **49 CFR 173.159a**. If you repackage our batteries either as batteries or as a component of another product you must

label the outer package "NON-SPILLABLE" per 49 CFR 173.159(f) and 49 CFR 173.159a.

## SECTION 15: Regulatory Information

In accordance with EU Battery Directive and the respective national legislation, Lead Acid batteries have to be marked by a crossed out dust bin with the chemical symbol for lead shown below, together with the ISO return/recycling symbol.



In addition some of the following hazard symbols described below might apply:



Corrosive



Explosive gas mixture



Read Instructions



Keep out of reach of



children

No Smoking, no open flames, no sparks.



Wear Safety Goggles.

### 15.1 STATE REGULATIONS (US):

**California proposition 65 warning:** Battery posts, terminals and related accessories contain lead and lead compounds chemical know to the state of California to cause cancer and reproductive harm. Battery also contain other chemical know to the state California to cause cancer. Wash hands after handling.

### 15.2 INTERNATIONAL REGULATIONS (Non-US):

#### National regulations(Canada):

**Canadian Domestic Substance List (DSL) :**All ingredients remaining in the finished product as distributed into commerce are included on the Domestic Substances List.

**Canada NDSL:** None of the components on this SDS are listed on the Canadian NDSL

**WHMIS Classifications:** Class E: Corrosive materials present at greater than 1% This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the Controlled Products Regulations.

About Battery Handling, please see the OSHA 29 CFR 1910.268(b) as below:

**910.268(b)(2)(i)** Eye protection devices which provide side as well as frontal eye protection for employees shall be provided when measuring storage battery specific gravity or handling electrolyte, and the employer shall ensure that such devices are used by the employees. The employer shall also ensure that acid resistant gloves and aprons shall be worn for protection against spattering. Facilities for quick drenching or flushing of the eyes and body shall be provided



unless the storage batteries are of the enclosed type and equipped with explosion proof vents, in which case sealed water rinse or neutralizing packs may be substituted for the quick drenching or flushing facilities. Employees assigned to work with storage batteries shall be instructed in emergency procedures such as dealing with accidental acid spills.

**1910.268(b)(2)(ii)** Electrolyte (acid or base, and distilled water) for battery cells shall be mixed in a well ventilated room. Acid or base shall be poured gradually, while stirring, into the water. Water shall never be poured into concentrated (greater than 75 percent) acid solutions. Electrolyte shall never be placed in metal containers nor stirred with metal objects.

**1910.268(b)(2)(iii)** When taking specific gravity readings, the open end of the hydrometer shall be covered with an acid resistant material while moving it from cell to cell to avoid splashing or throwing the electrolyte.

## **SECTION 16: Other Information**

Products such as Batteries are not in the scope of regulation which requires the publication of an EU Safety Data Sheet (91/155/EEC).

The information given above is provided in good faith based on existing knowledge and does not constitute an assurance of safety under all conditions. It is the user's responsibility to observe all laws and regulations applicable for storage, use, maintenance or disposal of the product. If there are any queries, the supplier should be consulted.

However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship. The contents and format of this SDS are in accordance with EEC Commission Directive 1272/2008/EC and EEC Commission Regulation 1907/2006/EC (REACH) Annex XVII.