

MATERIAL SAFETY DATA SHEET (MSDS)		
Valve Regulated Lead Acid (VRLA) Battery		
Date of preparation: 01.01.2021	Version: 1.0/ENG	Revision date: -

Attention:

According Regulation (EC) No 1907/2006 (REACH) a safety data sheet must be provided for substances and preparations only. Batteries are not affected by the requirements of this Regulation.

1. Identification of the substance and of the manufacturer

1.1. Product identifier

Valve Regulated Lead Acid (VRLA) Battery

1.2. Relevant identified uses of the substance or mixture and uses advised against

Rechargeable Storage Batteries

1.3. Details of the supplier of the safety data sheet

Supplier: CSG S.A.

Ul. Kalwaryjska 33

30-509, Kraków

POLAND

Phone number: +48 12 444 62 47

e-mail address: info@greencell.pl

1.4. Emergency telephone number (POLAND):

General emergency number: 112

Police: 997

Fire brigade: 998

Emergency medical service: 999

2. Hazards identification

2.1. Classification of the substance or mixture

The classification of the substance or the mixture which results from the application of the classification criteria in Regulation (EC) No 1272/2008.

Healths hazards:

Acute Tox. 4; H302: Acute toxicity (oral), category 4. Harmful if swallowed.

Acute Tox. 4; H332: Acute toxicity (inhalation), category 4. Harmful if inhaled.

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Skin Corr. 1A; H314: Causes skin irritation, category 1A. Causes severe skin burns and eye damage.

Eye Dam. 1; H318: Causes serious eye damage, category 1. Causes serious eye damage.

Repr. 1A; H360: Reproductive toxicity, category 1A. May damage fertility or the unborn child.

STOT RE 2; H373: Specific target organ toxicity - repeated exposure, category 2. May cause damage to organs through prolonged or repeated exposure.

Environmental hazards:

Aquatic Chronic 3; H412: Hazardous to the aquatic environment - chronic, category 3. Harmful to aquatic life with long lasting effects.

2.2. Label elements

Label in accordance with Regulation (EC) No 1272/2008.

The concentration of the absorbed dilute sulfuric acid depends on the degree battery charge.

Hazard pictograms:



Signal word:

DANGER

Hazard statements:

H302+H332: Harmful if swallowed or if inhaled.

H314: Causes severe skin burns and eye damage.

H360: May damage fertility or the unborn child.

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H373: May cause damage to organs through prolonged or repeated exposure.

H412: Harmful to aquatic life with long lasting effects.

Precautionary statements:

P101: If medical advice is needed, have product container or label at hand.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/ gas/mist/vapours/spray.

P263: Avoid contact during preg- nancy/while nursing.

P264: Wash ... thoroughly after handling.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313: IF exposed or concerned: Get medical advice/attention.

P363: Wash contaminated clothing before reuse.

P405: Store locked up.

P501: Dispose of contents/container to in accordance with local/regional/national/ international regulation (to be specified).

Supplemental information on the label:

The product is not dangerous when the recommended precautions are used when handling the product.

2.3. Other hazards

The product is not dangerous if it is not damaged and if the instructions are followed handling.

3. Composition/information on ingredients

Lead battery.

The concentration of the absorbed dilute sulfuric acid depends on the degree battery charge. The plastic from which the battery casing is made may differ in composition depending on the type of product.

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

Additional information

Due to the construction of the battery, hazardous components are not available to the user provided that the product is handled correctly.

4. First aid measures

The chemicals are contained in sealed cans. Upon normal conditions of use, risk of exposure occurs only if the battery is mechanically, thermally or electrically abused.

If chemicals leak attend these advices:

Inhalation:	Contents of an opened battery can cause respiratory irritation. Provide fresh air and call a doctor.
Skin contact:	Contents of an opened battery can cause skin irritation. Wash skin with soap and water.
Eye contact:	Contents of an opened battery can cause eye irritation. Immediately flush eyes thoroughly with water for 15 minutes and seek medical attention without delay.

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Ingestion: If contents of an opened cell has been swallowed do not give anything by mouth if the victim is unconscious or having convulsions. Rinse mouth thoroughly with water. Do not induce vomiting.
At spontaneous vomiting bring victim in lean- forward position in order to minimize risk of suffocation Rinse mouth thoroughly with water again.
Seek medical attention without delay.

If it should have come to an electric shock, your acting should be based on the following:

- do not touch the injured person until you have ensured the absence of voltage;
- take away exposed live cables from the injured person by using non-conductive items;
- primary objective in the treatment of unconscious patients is the maintenance of their breathing and cardiovascular system. If necessary you have to give cardiopulmonary resuscitation.
- cool burn injuries and cover them with an aseptic and non-fluffy wound dressing.

5. Firefighting measures

5.1. Extinguishing media

Unusual Fire and Explosion Hazards	Hydrogen and Oxygen gases are produced in cells during normal battery operation and expel into air through vent caps.
Suitable fire extinguishing agents	CO ² or dry powder extinguishing agents.
Unsuitable fire extinguishing agents	Water, if the battery voltage is above 120V.
Special protective equipment	Protective goggles, respiratory protective equipment, acid protective equipment, acid proof clothing in case of larger stationary battery plants or where larger quantities are stored.

5.2. Special hazards arising from the substance or mixture

Hydrogen Auto-ignition point:	580° C at 760 mm Hg.
Hydrogen Flash point:	-259° C.
Hydrogen Flammable Limits in Air (% by Volume):	Lower Explosion Limit (LEL): 4.1; Upper Explosion Limit (UEL): 74.2.

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5.3. Fire/explosion

Hydrogen and oxygen gases are produced in the cells during normal battery operation (hydrogen is flammable and oxygen supports combustion).

5.4. Advice for fire fighters

Wear tightly fitting safety goggles (EN 166), resistant protective clothing acids (EN 368/9) and use respiratory protection.

Use Positive Pressure, self-contained breathing apparatus.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Eye protection	Chemical goggles, safety glasses with side shields and or a full-face shield.
Protective gloves	Rubber, PVC or neoprene.
Respiratory Protection	Acid/organic vapor respirator.
Other protective equipment	Acid resistant apron or clothes.
Note: Personal Protective Equipment advice is contained in section 8.	

6.2. Environmental precautions

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

6.3. Methods and material for containment and cleaning up

For Containment	In the event of 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.
For Cleaning Up	Dispose of in accordance with local and national regulations.

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6.4. Reference to other sections

See Section 7 of the Material Safety Data Sheet for handling and handling the mixture storage. Refer to Section 8 of the MSDS on exposure controls and protection individual. See Section 13 of the Safety Data Sheet for waste disposal.

7. Handling and storage

7.1. Precautions for safe 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.

7.2. Conditions for safe storage, including any incompatibilities

- Storage batteries in a cool, dry area
- Storage 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.
- Do not store or charge or charge batteries in temperatures under -20°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.

7.3. Specific end use(s)

Battery

8. Exposure controls/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.

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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.
Sulfuric acid	231-639-5	7664-93-9	R-phrases: R35 causes severe chemical burns.
			S-phrases: S2: Keep out of reach 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 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 sulfuric acid.
- In the event of battery breakage, exposure to sulfuric acid and lead may occur.
- During high rate charges or overcharging acid mist may occur.

Eye/Face 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.

Other Protective equipment: 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 a work area.

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9. Physical and chemical properties

Item	Lead and lead compounds	Electrolyte
Appearance	Form: Solid	Liquid
	Color: Grey	Colorless
	Odor: Odorless	
PH	N/A	
Melting point/freezing point.	327.4 °C(melting point)	-35 to -60 °C
Initial boiling point and boiling range.	1740 °C(lit.)	Approx. 108-114°C
Flash point.	N/A	
Evaporation rate.	N/A	
Vapor pressure. (mm Hg at 20°C)	N.A.	< 0.3 mmHg
Vapor density.(Air=1)	7.1	3.4
Density(20°C)	11.35 g/cm ³	1.2 to 1.3 g/cm ³
solubility in water :	Very low (0.15mg/l)	Fully soluble
Partition coefficient: n-octanol/water.	N/A	
Decomposition temperature.	N/A	
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		

10. Stability and reactivity

Reactivity	Broken batteries may result in small amounts of spilled electrolyte. Electrolyte is a corrosive, nonflammable liquid. Electrolyte can destroy organic material such as cardboard, wood, textiles. Electrolyte may produce hydrogen as a reaction with some materials.
Chemical Stability	The battery and contents are stable under normal conditions of use.
Possibility of hazardous reactions	Hazardous polymerization will not occur.
Conditions to avoid	Overheating or overcharging the battery may result in acid mist and hydrogen generation.
Incompatibility (materials to avoid)	Strong alkaline materials, conductive metals, organic solvents, spark or open flame.
Hazardous decomposition products	Hydrogen gas may be generated in an overcharged condition, in fire or at very high temperatures. In fire, may emit CO, CO ² and Sulfur Oxides.

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11. Toxicological information

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 (IARC) 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.

12. Ecological information

<i>This information is of relevance if the battery is broken and the ingredients are released to environment.</i>
12.1 Electrolyte (diluted sulphuric acid) In order to avoid damage to the sewage system, the acid has to be neutralized by means of lime 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

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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).

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.

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14. Transport information

Land Transport	Land Transport (ADR / RID) <ul style="list-style-type: none"> • UN No: UN2800 • Classification ADR / RID: Class 8 • Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage • Packing Group ADR: not assigned • Tunnel code: E • ADR / RID: New and spent (used) batteries are exempt from all ADR /RID SP 598)
Sea Transport	Sea transport (IMDG Code) <ul style="list-style-type: none"> • UN No: UN2800 • Classification: Class 8 • Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage • EmS: F-A, S-B Non-Spillable batteries meet the requirements of Special Provision 238; they are exempt from all IMDG codes and are not subject to special regulation for sea Transport
Air Transport	Air Transport (IATA-DGR) <ul style="list-style-type: none"> • UN No: 2800 • Classification: Class 8 • Proper Shipping Name: BATTERIES, WET, NON-SPILLABLE electric storage • Special Provision A48: Packaging test are not considered necessary • Special Provision A67: Power-Sonic's VRLA batteries meet the requirements of Packing Instruction 872. The battery has been prepared for transport so as to prevent: a) A short-circuit of the battery's terminals by packaging in a strong and sturdy carton box; AND/OR b) The battery has been fitted with an insulating cover (made from ABS) which prevents contact with the terminals. c) Unintentional activation is thus prevented The words "NOT RESTRICTED" and the Special Provision (SP) number must be indicated on all shipping documents • Special Provision: A164: The battery has been prepared for transport so as to prevent: a) Short-circuit of the battery's terminals by packaging in a strong and sturdy carton box; AND/OR b) The battery has been fitted with a cover (made from ABS) which prevents contact with the terminals c) Unintentional activation is thus prevented
All methods of transport	DO NOT PLACE VRLA BATTERIES INSIDE SEALED OR GAS-TIGHT ENCLOSURES: VRLA Batteries emit hydrogen gas which is highly flammable and will form explosive mixtures in air from approximately 4% to 76%. This can be ignited by a spark at any voltage, naked flames or other sources of ignition

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15. Regulatory information

15. 1. Safety, health and environmental regulations/legislation specific for the substance or mixture

The product is an article and does not require a safety data sheet in accordance with the Regulation (EC) No. 1907/2006 (REACH). This safety data sheet is a voluntary source information for users to take necessary health-related measures human health, safety at work and environmental protection. According to the regulations, batteries and accumulators placed on the market should be labelled the symbol of selective collection. Batteries and accumulators containing more than 0.004% by weight of lead should be marked chemical symbol Pb. Batteries can also be additionally marked with a recycling code.

Notes to regulations concerning the transport of hazardous goods:

- European Agreement concerning the International Carriage of Dangerous Goods by Road;
- Convention concerning International Carriage by Rail;
- European Agreement concerning the International Carriage of Dangerous Goods by Inland Navigation;
- International Maritime Dangerous Goods Code;
- International Civil Aviation Organization / Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO-TI);
- International Air Transport Association / Dangerous Goods Regulations (IATA-DGR).

16. Other information

Under normal conditions of battery use, internal components will not present a health hazard. The information contained in this Safety Data Sheet is provided for battery electrolyte (acid) and lead, for exposure that may occur during battery production or container breakage or under extreme heat conditions such as fire. This Safety Data Sheet and the information therein does not constitute the user's own assessment of work place risk as required by other Health & Safety legislation.