

# Valve Regulated Lead-Acid Battery (VRLA) - AGM & GEL

## Ramcar Australia & New Zealand

Chemwatch Hazard Alert Code: 4

Chemwatch: 42-7399

Version No: 14.1

Safety Data Sheet according to WHS Regulations (Hazardous Chemicals) Amendment 2020 and ADG requirements

Issue Date: 10/03/2023

Print Date: 18/04/2023

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

#### Product Identifier

Product name	Valve Regulated Lead-Acid Battery (VRLA) - AGM & GEL
Chemical Name	Not Applicable
Synonyms	Not Available
Proper shipping name	BATTERIES, WET, NON-SPILLABLE, electric storage
Chemical formula	Not Applicable
Other means of identification	Not Available

#### Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Battery. NOTE: Battery presents no chemical hazards during the normal operation provided the recommendations for handling, storage, transport and usage are observed. If the battery is broken and the internal components exposed, health hazards exist which require careful attention. NOTE: The chemical hazards relate to the released contents. Undamaged sealed Lead-acid batteries normally present a low hazard, however damaged batteries may release highly corrosive and toxic contents. Disassembly, abuse or destruction of battery cell may cause violent explosion with scattering of contents. Heating may cause bursting with release of contents.
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#### Details of the manufacturer or supplier of the safety data sheet

Registered company name	Ramcar Australia & New Zealand
Address	Unit A, 1 Reconciliation Rise Pemulwuy NSW 2145 Australia
Telephone	+61 2 9840 2800
Fax	Not Available
Website	www.supercharge.com.au; www.exidebatteries.com.au; www.marshallbateries.com.au; www.enirgipower.com.au
Email	whsercw@ramcar.com.au

#### Emergency telephone number

Association / Organisation	CHEMWATCH EMERGENCY RESPONSE (24/7)
Emergency telephone numbers	+61 1800 951 288
Other emergency telephone numbers	+61 3 9573 3188

Once connected and if the message is not in your preferred language then please dial 01

### SECTION 2 Hazards identification

#### Classification of the substance or mixture

Poisons Schedule	Not Applicable
Classification [1]	Acute Toxicity (Oral) Category 4, Skin Corrosion/Irritation Category 1A, Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Inhalation) Category 3, Reproductive Toxicity Category 1A, Reproductive Toxicity Effects on or via Lactation, Specific Target Organ Toxicity - Repeated Exposure Category 2, Hazardous to the Aquatic Environment Acute Hazard Category 3, Hazardous to the Aquatic Environment Long-Term Hazard Category 1
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

#### Label elements

Hazard pictogram(s)	
Signal word	Danger

#### Hazard statement(s)

H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.

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H331	Toxic if inhaled.
H360Df	May damage the unborn child. Suspected of damaging fertility.
H362	May cause harm to breast-fed children.
H373	May cause damage to organs through prolonged or repeated exposure.
H402	Harmful to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

## Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe dust/fume.
P263	Avoid contact during pregnancy and while nursing.
P264	Wash all exposed external body areas thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.

## Precautionary statement(s) Response

P301+P330+P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or 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.
P310	Immediately call a POISON CENTER/doctor/physician/first aider.
P363	Wash contaminated clothing before reuse.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P391	Collect spillage.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/physician/first aider if you feel unwell.

## Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

## Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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## SECTION 3 Composition / information on ingredients

## Substances

See section below for composition of Mixtures

## Mixtures

CAS No	%[weight]	Name
Not Available		Sealed container with electrochemical
Not Available		contents typically,
7439-92-1	50-80	<u>lead</u>
1309-60-0	15-40	<u>lead dioxide</u>
Not Available		electrolyte (no fluid/ completely absorbed) as;
7664-93-9	5-30	<u>sulfuric acid</u>
Not Available		case material as;
9003-07-0	<10	<u>polypropylene</u>
9003-56-9		<u>styrene/ butadiene/ acrylonitrile copolymer</u>
Not Available	<5	separator
7440-31-5	<2	<u>tin</u>
7440-70-2	<1	<u>calcium</u>

**Legend:** 1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; \* EU IOELVs available

## SECTION 4 First aid measures

## Description of first aid measures

<b>Eye Contact</b>	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>▶ Immediately hold eyelids apart and flush the eye continuously with running water.</li> <li>▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper</li> </ul>
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Continued...

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	<ul style="list-style-type: none"> <li>and lower lids.</li> <li>▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.</li> <li>▶ Transport to hospital or doctor without delay.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul>
<b>Skin Contact</b>	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately flush body and clothes with large amounts of water, using safety shower if available.</li> <li>▶ Quickly remove all contaminated clothing, including footwear.</li> <li>▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.</li> <li>▶ Transport to hospital, or doctor.</li> </ul>
<b>Inhalation</b>	<ul style="list-style-type: none"> <li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li> <li>▶ Lay patient down. Keep warm and rested.</li> <li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li> <li>▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li> <li>▶ Transport to hospital, or doctor, without delay.</li> </ul>
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>▶ For advice, contact a Poisons Information Centre or a doctor at once.</li> <li>▶ Urgent hospital treatment is likely to be needed.</li> <li>▶ <b>If swallowed do NOT induce vomiting.</b></li> <li>▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li> <li>▶ Observe the patient carefully.</li> <li>▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.</li> <li>▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.</li> <li>▶ Transport to hospital or doctor without delay.</li> </ul>

**Indication of any immediate medical attention and special treatment needed**

Treat symptomatically.

For acute or short term repeated exposures to strong acids:

- ▶ Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- ▶ Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- ▶ Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- ▶ Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

**INGESTION:**

- ▶ Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- ▶ **DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.**
- ▶ Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- ▶ Charcoal has no place in acid management.
- ▶ Some authors suggest the use of lavage within 1 hour of ingestion.

**SKIN:**

- ▶ Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- ▶ Deep second-degree burns may benefit from topical silver sulfadiazine.

**EYE:**

- ▶ Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- ▶ Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- ▶ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

**[Ellenhorn and Barceloux: Medical Toxicology]**

- ▶ Gastric acids solubilise lead and its salts and lead absorption occurs in the small bowel.
- ▶ Particles of less than 1 µm diameter are substantially absorbed by the alveoli following inhalation.
- ▶ Lead is distributed to the red blood cells and has a half-life of 35 days. It is subsequently redistributed to soft tissue & bone-stores or eliminated. The kidney accounts for 75% of daily lead loss; integumentary and alimentary losses account for the remainder.
- ▶ Neurasthenic symptoms are the most common symptoms of intoxication. Lead toxicity produces a classic motor neuropathy. Acute encephalopathy appears infrequently in adults. Diazepam is the best drug for seizures.
- ▶ Whole-blood lead is the best measure of recent exposure; free erythrocyte protoporphyrin (FEP) provides the best screening for chronic exposure. Obvious clinical symptoms occur in adults when whole-blood lead exceeds 80 µg/dL.
- ▶ British Anti-Lewisite is an effective antidote and enhances faecal and urinary excretion of lead. The onset of action of BAL is about 30 minutes and most of the chelated metal complex is excreted in 4-6 hours, primarily in the bile. Adverse reaction appears in up to 50% of patients given BAL in doses exceeding 5 mg/kg. CaNa2EDTA has also been used alone or in concert with BAL as an antidote. D-penicillamine is the usual oral agent for mobilisation of bone lead; its use in the treatment of lead poisoning remains investigational. 2,3-dimercapto-1-propanesulfonic acid (DMPS) and dimercaptosuccinic acid (DMSA) are water soluble analogues of BAL and their effectiveness is undergoing review. As a rule, stop BAL if lead decreases below 50 µg/dL; stop CaNa2EDTA if blood lead decreases below 40 µg/dL or urinary lead drops below 2 mg/24hrs.

**[Ellenhorn & Barceloux: Medical Toxicology]****BIOLOGICAL EXPOSURE INDEX - BEI**

These represent the determinants observed in specimens collected from a healthy worker who has been exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
1. Lead in blood	30 µg/100 ml	Not Critical	
2. Lead in urine	150 µg/gm creatinine	Not Critical	B
3. Zinc protoporphyrin in blood	250 µg/100 ml erythrocytes OR 100 µg/100 ml blood	After 1 month exposure	B

B: Background levels occur in specimens collected from subjects **NOT** exposed.

**SECTION 5 Firefighting measures****Extinguishing media**

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

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## Special hazards arising from the substrate or mixture

Fire Incompatibility	<ul style="list-style-type: none"> <li>▶ Keep dry</li> <li>▶ <b>NOTE:</b> May develop pressure in containers; open carefully. Vent periodically.</li> </ul>
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## Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear full body protective clothing with breathing apparatus.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water course.</li> <li>▶ Use fire fighting procedures suitable for surrounding area.</li> <li>▶ <b>Do not approach containers suspected to be hot.</b></li> <li>▶ Cool fire exposed containers with water spray from a protected location.</li> <li>▶ If safe to do so, remove containers from path of fire.</li> <li>▶ Equipment should be thoroughly decontaminated after use.</li> </ul> <p>Slight hazard when exposed to heat, flame and oxidisers.</p>
Fire/Explosion Hazard	<ul style="list-style-type: none"> <li>▶ Non combustible.</li> <li>▶ Not considered to be a significant fire risk.</li> <li>▶ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.</li> <li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>▶ May emit corrosive, poisonous fumes. May emit acrid smoke.</li> </ul> <p>Decomposition may produce toxic fumes of: sulfur oxides (SOx) metal oxides</p>
HAZCHEM	2R

## SECTION 6 Accidental release measures

## Personal precautions, protective equipment and emergency procedures

See section 8

## Environmental precautions

See section 12

## Methods and material for containment and cleaning up

Minor Spills	<ul style="list-style-type: none"> <li>▶ Clean up all spills immediately.</li> <li>▶ Secure load if safe to do so.</li> <li>▶ Bundle/collect recoverable product.</li> <li>▶ Collect remaining material in containers with covers for disposal.</li> </ul>
Major Spills	<p>Remove combustible materials and all ignition sources. Acid spills may be neutralised with soda ash.</p> <ul style="list-style-type: none"> <li>▶ Clean up all spills immediately.</li> <li>▶ Wear protective clothing, safety glasses, dust mask, gloves.</li> <li>▶ Secure load if safe to do so. Bundle/collect recoverable product.</li> <li>▶ Use dry clean up procedures and avoid generating dust.</li> <li>▶ Vacuum up (consider explosion-proof machines designed to be grounded during storage and use).</li> <li>▶ Water may be used to prevent dusting.</li> <li>▶ Collect remaining material in containers with covers for disposal.</li> <li>▶ Flush spill area with water.</li> </ul>

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

## SECTION 7 Handling and storage

## Precautions for safe handling

Safe handling	<p>Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area</p> <ul style="list-style-type: none"> <li>▶ Avoid smoking, naked lights or ignition sources.</li> </ul> <p><b>When handling, DO NOT eat, drink or smoke.</b> Wash hands with soap and water after handling.</p> <ul style="list-style-type: none"> <li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.</li> </ul>
Other information	<ul style="list-style-type: none"> <li>▶ <b>DO NOT store near acids, or oxidising agents</b></li> <li>▶ Store in original containers.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ Store in a cool, dry, well-ventilated area.</li> <li>▶ Store away from incompatible materials and foodstuff containers.</li> <li>▶ Protect containers against physical damage and check regularly for leaks.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Store away from incompatible materials.</li> </ul>

## Conditions for safe storage, including any incompatibilities

Suitable container	Store in original containers.
Storage incompatibility	<p>Protect from accidental short-circuit.</p> <ul style="list-style-type: none"> <li>▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.</li> <li>▶ Keep dry</li> <li>▶ Avoid strong bases.</li> </ul>

## SECTION 8 Exposure controls / personal protection

## Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL

## Control parameters

## Occupational Exposure Limits (OEL)

## INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	lead	Lead, inorganic dusts & fumes (as Pb)	0.05 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	lead dioxide	Lead, inorganic dusts & fumes (as Pb)	0.05 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	sulfuric acid	Sulphuric acid	1 mg/m3	3 mg/m3	Not Available	Not Available
Australia Exposure Standards	tin	Tin, metal	2 mg/m3	Not Available	Not Available	Not Available

## Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
lead	0.15 mg/m3	120 mg/m3	700 mg/m3
lead dioxide	0.17 mg/m3	140 mg/m3	810 mg/m3
sulfuric acid	Not Available	Not Available	Not Available
polypropylene	5.2 mg/m3	58 mg/m3	350 mg/m3
tin	6 mg/m3	67 mg/m3	400 mg/m3

Ingredient	Original IDLH	Revised IDLH
lead	Not Available	Not Available
lead dioxide	100 mg/m3	Not Available
sulfuric acid	15 mg/m3	Not Available
polypropylene	Not Available	Not Available
styrene/ butadiene/ acrylonitrile copolymer	Not Available	Not Available
tin	Not Available	Not Available
calcium	Not Available	Not Available

## Occupational Exposure Banding


Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
calcium	C	> 0.1 to ≤ milligrams per cubic meter of air (mg/m <sup>3</sup> )

**Notes:** Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.

## Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <p>Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. An approved self contained breathing apparatus (SCBA) may be required in some situations.</p> <p>Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.</p>											
	<table border="1"> <thead> <tr> <th>Type of Contaminant:</th> <th>Air Speed:</th> </tr> </thead> <tbody> <tr> <td>solvent, vapours, degreasing etc., evaporating from tank (in still air).</td> <td>0.25-0.5 m/s (50-100 f/min.)</td> </tr> <tr> <td>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)</td> <td>0.5-1 m/s (100-200 f/min.)</td> </tr> <tr> <td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td> <td>1-2.5 m/s (200-500 f/min.)</td> </tr> <tr> <td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</td> <td>2.5-10 m/s (500-2000 f/min.)</td> </tr> </tbody> </table>	Type of Contaminant:	Air Speed:	solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)	aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)	direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)	grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)	
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<p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations,</p>												

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	producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.
<b>Individual protection measures, such as personal protective equipment</b>	
<b>Eye and face protection</b>	None under normal operating conditions. <b>OTHERWISE:</b> <ul style="list-style-type: none"> <li>▶ Safety glasses with side shields.</li> <li>▶ Chemical goggles.</li> <li>▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]</li> </ul>
<b>Skin protection</b>	See Hand protection below
<b>Hands/feet protection</b>	<ul style="list-style-type: none"> <li>▶ Elbow length PVC gloves</li> </ul> Wear safety footwear.
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	No special equipment needed when handling small quantities. <b>OTHERWISE:</b> <ul style="list-style-type: none"> <li>▶ Overalls.</li> <li>▶ Barrier cream.</li> <li>▶ Eyewash unit.</li> </ul>

**Recommended material(s)****GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the:

**"Forsberg Clothing Performance Index".**

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

Valve Regulated Lead-Acid Battery (VRLA) - AGM & GEL

Material	CPI
NATURAL RUBBER	A
NATURAL+NEOPRENE	A
NEOPRENE	A
NEOPRENE/NATURAL	A
NITRILE	A
PE	A
PVC	A
SARANEX-23	A

\* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

**NOTE:** As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

\* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

**Respiratory protection**

Type AE-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AE-AUS P2	-	AE-PAPR-AUS / Class 1 P2
up to 50 x ES	-	AE-AUS / Class 1 P2	-
up to 100 x ES	-	AE-2 P2	AE-PAPR-2 P2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

**SECTION 9 Physical and chemical properties****Information on basic physical and chemical properties**

Appearance	Manufactured article; insoluble in water.		
<b>Physical state</b>	Manufactured	<b>Relative density (Water = 1)</b>	Not Available
<b>Odour</b>	Not Available	<b>Partition coefficient n-octanol / water</b>	Not Available
<b>Odour threshold</b>	Not Available	<b>Auto-ignition temperature (°C)</b>	Not Applicable
<b>pH (as supplied)</b>	Not Applicable	<b>Decomposition temperature (°C)</b>	Not Available
<b>Melting point / freezing point (°C)</b>	Not Applicable	<b>Viscosity (cSt)</b>	Not Applicable
<b>Initial boiling point and boiling range (°C)</b>	Not Applicable	<b>Molecular weight (g/mol)</b>	Not Applicable
<b>Flash point (°C)</b>	Not Applicable	<b>Taste</b>	Not Available

Continued...

## Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL

<b>Evaporation rate</b>	Not Applicable	<b>Explosive properties</b>	Not Available
<b>Flammability</b>	Not Applicable	<b>Oxidising properties</b>	Not Available
<b>Upper Explosive Limit (%)</b>	74.2 (H2 gas in air)	<b>Surface Tension (dyn/cm or mN/m)</b>	Not Applicable
<b>Lower Explosive Limit (%)</b>	4.1 (H2 gas in air)	<b>Volatile Component (%vol)</b>	Not Applicable
<b>Vapour pressure (kPa)</b>	Not Applicable	<b>Gas group</b>	Not Available
<b>Solubility in water</b>	Immiscible	<b>pH as a solution (1%)</b>	Not Applicable
<b>Vapour density (Air = 1)</b>	Not Applicable	<b>VOC g/L</b>	Not Applicable

## SECTION 10 Stability and reactivity

<b>Reactivity</b>	See section 7
<b>Chemical stability</b>	<ul style="list-style-type: none"> <li>▸ Contact with alkaline material liberates heat</li> <li>· Unstable in the presence of incompatible materials</li> </ul>
<b>Possibility of hazardous reactions</b>	See section 7
<b>Conditions to avoid</b>	See section 7
<b>Incompatible materials</b>	See section 7
<b>Hazardous decomposition products</b>	See section 5

## SECTION 11 Toxicological information

## Information on toxicological effects

<b>Inhaled</b>	Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. High concentrations cause inflamed airways and watery swelling of the lungs with oedema. Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.
<b>Ingestion</b>	Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.
<b>Skin Contact</b>	Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.
<b>Eye</b>	If applied to the eyes, this material causes severe eye damage. Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.
<b>Chronic</b>	Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.  Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects. Ample evidence exists that developmental disorders are directly caused by human exposure to the material. Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility. Lead, in large amounts, can affect the blood, nervous system, heart, glands, immune system and digestive system. Anaemia may occur.

<b>Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>lead</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
	Inhalation(Rat) LC50: >5.05 mg/4h <sup>[1]</sup>	
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	
<b>lead dioxide</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
<b>sulfuric acid</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Inhalation(Mouse) LC50: 0.85 mg/4h <sup>[1]</sup>	Eye (rabbit): 1.38 mg SEVERE
	Oral (Rat) LD50: 2140 mg/kg <sup>[2]</sup>	Eye (rabbit): 5 mg/30sec SEVERE
<b>polypropylene</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (Mouse) LD50: 3200 mg/kg <sup>[2]</sup>	Not Available
<b>styrene/ butadiene/ acrylonitrile copolymer</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: 5010 mg/kg <sup>[2]</sup>	Not Available



## Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL

	Oral (Rat) LD50: 5010 mg/kg <sup>[2]</sup>	
tin	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
	Inhalation(Rat) LC50: >4.75 mg/l4h <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	
calcium	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: >2500 mg/kg <sup>[1]</sup>	Eye: no adverse effect observed (not irritating) <sup>[1]</sup>
	Oral (Rat) LD50: >2000 mg/kg <sup>[1]</sup>	Skin: no adverse effect observed (not irritating) <sup>[1]</sup>
<b>Legend:</b>	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	

<b>LEAD</b>	WARNING: Lead is a cumulative poison and has the potential to cause abortion and intellectual impairment to unborn children of pregnant workers.
<b>SULFURIC ACID</b>	Occupational exposures to strong inorganic acid mists of sulfuric acid: <b>WARNING:</b> For inhalation exposure <u>ONLY</u> : This substance has been classified by the IARC as Group 1: <b>CARCINOGENIC TO HUMANS</b>
<b>POLYPROPYLENE</b>	* For pyrolyzate For poly-alpha-olefins (PAOs): PAOs are highly branched, isoparaffinic chemicals produced by oligomerisation of 1-octene, 1-decene and/or 1-dodecene. The crude polyalphaolefin mixture is then distilled into appropriate product fractions to meet specific viscosity specifications and hydrogenated. In existing data, there appears to be no data to show that these structural analogs cause health effects. In addition, there is evidence in the literature that alkanes with 30 or more carbon atoms are unlikely to be absorbed when given by mouth. The physical and chemical properties make it unlikely that significant absorption into the body will occur. There are also no functional groups on PAO molecules that are biologically active. PAOs also have low volatility, so that exposure is unlikely to occur by inhalation. The high viscosity of these substances also makes it hard to generate a high concentration of breathable particles in air. Acute toxicity: Animal testing shows that PAOs have relatively low acute toxicity. Repeat dose toxicity: Animal testing shows that PAOs show low repeat dose toxicity – some increased scaling of the skin occurred, with skin inflammation, after exposure at high doses. Reproductive toxicity: Animal testing suggested that application of PAO to skin did not impair reproductive performance. Genetic toxicity: Testing has not shown any evidence that PAOs cause mutations or chromosomal aberrations. Cancer-causing potentials: Animal testing has not shown any propensity to cause tumours. While alpha-olefin polymers have similar properties to mineral oils, they do not contain polycyclic aromatic hydrocarbons, or other known cancer-causing materials.
<b>STYRENE/ BUTADIENE/ ACRYLONITRILE COPOLYMER</b>	Ultrafine particles (UFPs) may be produced at lower temperatures during the 3D printing process Concerns have been raised regarding airborne UFP concentrations generated while printing with ABS, as UFPs have been linked with adverse health effects
<b>CALCIUM</b>	The solid may react violently on contact with wet skin tissue, i.e. eyes, mouth, causing chemical and thermal burns. The acute effects include burns, ulceration, or tissue death, severe eye damage (corneal burns or opacification), and probable blindness. Inhalation of dust or fumes (especially from a fire involving calcium) will cause shortness of breath, nausea, headache, nose and respiratory tract irritation and in extreme, pneumonitis
<b>Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL &amp; TIN &amp; CALCIUM</b>	No significant acute toxicological data identified in literature search.
<b>SULFURIC ACID &amp; CALCIUM</b>	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.
<b>POLYPROPYLENE &amp; STYRENE/ BUTADIENE/ ACRYLONITRILE COPOLYMER</b>	The substance is classified by IARC as Group 3: <b>NOT</b> classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.

<b>Acute Toxicity</b>	✓	<b>Carcinogenicity</b>	✗
<b>Skin Irritation/Corrosion</b>	✓	<b>Reproductivity</b>	✓
<b>Serious Eye Damage/Irritation</b>	✓	<b>STOT - Single Exposure</b>	✗
<b>Respiratory or Skin sensitisation</b>	✗	<b>STOT - Repeated Exposure</b>	✓
<b>Mutagenicity</b>	✗	<b>Aspiration Hazard</b>	✗

**Legend:** ✗ – Data either not available or does not fill the criteria for classification  
✓ – Data available to make classification

## SECTION 12 Ecological information

## Toxicity

Valve Regulated Lead-Acid Battery (VRLA) - AGM & GEL	Endpoint	Test Duration (hr)	Species	Value	Source
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Continued...



## Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL

	Not Available	Not Available	Not Available	Not Available	Not Available
lead	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	672h	Fish	0.00003mg/l	4
	EC50	96h	Algae or other aquatic plants	0.282-0.864mg/l	4
	EC50	72h	Algae or other aquatic plants	0.0205mg/l	2
	LC50	96h	Fish	0.0079mg/l	2
	EC50	48h	Crustacea	0.029mg/l	2
lead dioxide	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	264h	Algae or other aquatic plants	0.0091mg/l	2
sulfuric acid	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	ErC50	72h	Algae or other aquatic plants	>100mg/l	2
	NOEC(ECx)	1560h	Fish	0.025mg/l	2
	EC50	72h	Algae or other aquatic plants	>100mg/l	2
	LC50	96h	Fish	8mg/l	1
	EC50	48h	Crustacea	42.5mg/l	1
polypropylene	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	Not Available	Not Available	Not Available	Not Available	Not Available
styrene/ butadiene/ acrylonitrile copolymer	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	Not Available	Not Available	Not Available	Not Available	Not Available
tin	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	168h	Crustacea	<0.005mg/l	2
	EC50	72h	Algae or other aquatic plants	>0.0192mg/l	2
	LC50	96h	Fish	>0.0124mg/l	2
calcium	<b>Endpoint</b>	<b>Test Duration (hr)</b>	<b>Species</b>	<b>Value</b>	<b>Source</b>
	NOEC(ECx)	336h	Crustacea	32mg/l	2
	EC50	48h	Crustacea	49.1mg/l	2
<b>Legend:</b>	Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data				

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**DO NOT** discharge into sewer or waterways.

## Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
polypropylene	LOW	LOW

## Bioaccumulative potential

Ingredient	Bioaccumulation
polypropylene	LOW (LogKOW = 1.6783)

## Mobility in soil

Ingredient	Mobility
polypropylene	LOW (KOC = 23.74)

## SECTION 13 Disposal considerations



## Waste treatment methods

<b>Product / Packaging disposal</b>	<ul style="list-style-type: none"> <li>▶ Containers may still present a chemical hazard/ danger when empty.</li> <li>▶ Return to supplier for reuse/ recycling if possible.</li> </ul> Otherwise: <ul style="list-style-type: none"> <li>▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.</li> <li>▶ Where possible retain label warnings and SDS and observe all notices pertaining to the product.</li> </ul>
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## SECTION 14 Transport information

## Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL

## Labels Required

	
Marine Pollutant	
HAZCHEM	2R

## Land transport (ADG)

UN number or ID number	2800	
UN proper shipping name	BATTERIES, WET, NON-SPILLABLE, electric storage	
Transport hazard class(es)	Class	8
	Subsidiary risk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Environmentally hazardous	
Special precautions for user	Special provisions	238
	Limited quantity	1 L

## Air transport (ICAO-IATA / DGR)

UN number	2800	
UN proper shipping name	Batteries, wet, non-spillable electric storage	
Transport hazard class(es)	ICAO/IATA Class	8
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	8L
Packing group	Not Applicable	
Environmental hazard	Environmentally hazardous	
Special precautions for user	Special provisions	A48 A67 A164 A183
	Cargo Only Packing Instructions	872
	Cargo Only Maximum Qty / Pack	No Limit
	Passenger and Cargo Packing Instructions	872
	Passenger and Cargo Maximum Qty / Pack	No Limit
	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden
	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden

## Sea transport (IMDG-Code / GGVSee)

UN number	2800	
UN proper shipping name	BATTERIES, WET, NON-SPILLABLE electric storage	
Transport hazard class(es)	IMDG Class	8
	IMDG Subrisk	Not Applicable
Packing group	Not Applicable	
Environmental hazard	Marine Pollutant	
Special precautions for user	EMS Number	F-A, S-B
	Special provisions	238
	Limited Quantities	1 L

Non-spillable batteries are not subject to Dangerous Goods Transport requirements if conditions specified in the applicable Special provisions are met. Applicable special provisions: 238 (ADR, ADN, ADG, IMDG, UN) or A67 (IATA).

## Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

## Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
lead	Not Available

Continued...

## Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL

Product name	Group
lead dioxide	Not Available
sulfuric acid	Not Available
polypropylene	Not Available
styrene/ butadiene/ acrylonitrile copolymer	Not Available
tin	Not Available
calcium	Not Available

## Transport in bulk in accordance with the IGC Code

Product name	Ship Type
lead	Not Available
lead dioxide	Not Available
sulfuric acid	Not Available
polypropylene	Not Available
styrene/ butadiene/ acrylonitrile copolymer	Not Available
tin	Not Available
calcium	Not Available

## SECTION 15 Regulatory information

## Safety, health and environmental regulations / legislation specific for the substance or mixture

## lead is found on the following regulatory lists

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 4  
 Australian Inventory of Industrial Chemicals (AIIC)  
 Chemical Footprint Project - Chemicals of High Concern List  
 International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans  
 International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans  
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## lead dioxide is found on the following regulatory lists

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 10 / Appendix C  
 Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6  
 Australian Inventory of Industrial Chemicals (AIIC)  
 Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs  
 International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2A: Probably carcinogenic to humans  
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## sulfuric acid is found on the following regulatory lists

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6  
 Australian Inventory of Industrial Chemicals (AIIC)  
 Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs  
 International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 1: Carcinogenic to humans

## polypropylene is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)  
 Chemical Footprint Project - Chemicals of High Concern List

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic  
 International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## styrene/ butadiene/ acrylonitrile copolymer is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)  
 International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## tin is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)

## calcium is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

## National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDLS	No (lead; lead dioxide; sulfuric acid; polypropylene; styrene/ butadiene/ acrylonitrile copolymer; tin; calcium)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	No (polypropylene; styrene/ butadiene/ acrylonitrile copolymer)

## Valve Regulated Lead-Acid Battery (VRLA) - AGM &amp; GEL

National Inventory	Status
Japan - ENCS	No (lead; tin; calcium)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes

**Legend:** Yes = All CAS declared ingredients are on the inventory  
No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

## SECTION 16 Other information

Revision Date	10/03/2023
Initial Date	26/08/2014

## SDS Version Summary

Version	Date of Update	Sections Updated
13.1	10/12/2021	Classification change due to full database hazard calculation/update.
14.1	10/03/2023	Classification change due to full database hazard calculation/update.

## Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

## Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average  
 PC – STEL: Permissible Concentration-Short Term Exposure Limit  
 IARC: International Agency for Research on Cancer  
 ACGIH: American Conference of Governmental Industrial Hygienists  
 STEL: Short Term Exposure Limit  
 TEEL: Temporary Emergency Exposure Limit.  
 IDLH: Immediately Dangerous to Life or Health Concentrations  
 ES: Exposure Standard  
 OSF: Odour Safety Factor  
 NOAEL :No Observed Adverse Effect Level  
 LOAEL: Lowest Observed Adverse Effect Level  
 TLV: Threshold Limit Value  
 LOD: Limit Of Detection  
 OTV: Odour Threshold Value  
 BCF: BioConcentration Factors  
 BEI: Biological Exposure Index  
 AIIC: Australian Inventory of Industrial Chemicals  
 DSL: Domestic Substances List  
 NDSL: Non-Domestic Substances List  
 IECSC: Inventory of Existing Chemical Substance in China  
 EINECS: European Inventory of Existing Commercial chemical Substances  
 ELINCS: European List of Notified Chemical Substances  
 NLP: No-Longer Polymers  
 ENCS: Existing and New Chemical Substances Inventory  
 KECI: Korea Existing Chemicals Inventory  
 NZIoC: New Zealand Inventory of Chemicals  
 PICCS: Philippine Inventory of Chemicals and Chemical Substances  
 TSCA: Toxic Substances Control Act  
 TCSI: Taiwan Chemical Substance Inventory  
 INSQ: Inventario Nacional de Sustancias Químicas  
 NCI: National Chemical Inventory  
 FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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