

# Ramset Lithium-ion Batteries - Rechargeable (All Models)

RamsetReid

Chemwatch: 85-0235

Version No: 2.1.1.1

Safety Data Sheet according to WHS and ADG requirements

Chemwatch Hazard Alert Code: 1

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## SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

### Product Identifier

Product name	Ramset Lithium-ion Batteries - Rechargeable (All Models)
Synonyms	Product Code: CBATR18, CBATR18HD, CBATR18HD5, CBATR28
Proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
Other means of identification	Not Available

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

Relevant identified uses	Lithium battery. Electricity storage. NOTE: Chemical materials are stored in sealed metal case. The toxic properties of the electrode materials are hazardous only if the materials are released by damaging the cell or if exposed to fire. The sealed battery is not hazardous in normal use. The chemical hazards are related to the leaked battery contents.
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### Details of the supplier of the safety data sheet

Registered company name	RamsetReid
Address	1 Ramset Drive Chimside Park VIC 3116 Australia
Telephone	1300 780 250
Fax	1300 780 122
Website	www.ramset.com.au, www.ramset.co.nz
Email	enquiry@ramset.com.au

### Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	1300 780 063 (24hrs)
Other emergency telephone numbers	Not Available

## SECTION 2 HAZARDS IDENTIFICATION

### Classification of the substance or mixture

**DANGEROUS GOODS. NON-HAZARDOUS CHEMICAL.** According to the WHS Regulations and the ADG Code.

#### CHEMWATCH HAZARD RATINGS

	Min	Max	
Flammability	0		
Toxicity	1		0 = Minimum 1 = Low 2 = Moderate 3 = High 4 = Extreme
Body Contact	1		
Reactivity	0		
Chronic	0		

Poisons Schedule	Not Applicable
Classification <sup>[1]</sup>	Acute Aquatic Hazard Category 3, Chronic Aquatic Hazard Category 3
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HSIS ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI

### Label elements

Hazard pictogram(s)	Not Applicable
SIGNAL WORD	<b>NOT APPLICABLE</b>

### Hazard statement(s)

H412	Harmful to aquatic life with long lasting effects.
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### Supplementary statement(s)

Not Applicable

### CLP classification (additional)

Continued...

Not Applicable

**Precautionary statement(s) Prevention**

P273	Avoid release to the environment.
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**Precautionary statement(s) Response**

Not Applicable

**Precautionary statement(s) Storage**

Not Applicable

**Precautionary statement(s) Disposal**

P501	Dispose of contents/container in accordance with local regulations.
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**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS****Substances**

See section below for composition of Mixtures

**Mixtures**

CAS No	%[weight]	Name
		sealed metal case comprising and containing
Not Available	10-50	metal oxide or other electrolyte (proprietary)
7440-44-0	10-30	<u>carbon, non-activated</u>
Not Available	0-17	linear & cyclic carbonate solvents
7440-50-8	0.1-10	<u>copper</u>
7429-90-5	0.1-10	<u>aluminium</u>
21324-40-3	0-5	<u>lithium fluorophosphate</u>
24937-79-9	0.1-5	<u>vinylidene fluoride homopolymer</u>
Not Available	<5	styrene butadiene rubber (SBR)
92-52-4	0.1-0.3	<u>biphenyl</u>
	balance	aluminium, steel, nickel and other inert materials

**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>▶ Wash out immediately with fresh 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 and lower lids.</li> <li>▶ Seek medical attention without delay; if pain persists or recurs seek medical attention.</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 contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately remove all contaminated clothing, including footwear.</li> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul>
<b>Inhalation</b>	Remove patient to fresh air and seek medical attention.
<b>Ingestion</b>	<ul style="list-style-type: none"> <li>▶ Not considered a normal route of entry.</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>▶ Seek medical advice.</li> </ul>

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

Treat symptomatically.

**SECTION 5 FIREFIGHTING MEASURES****Extinguishing media**

Small fires: use D type fire extinguisher, inert gas (for instance blend of argon and nitrogen), CO<sub>2</sub>, dry chemical powder or foam extinguishers. Large fires: use large quantities of water for the surrounding fire and to prevent propagation. If water is used on live batteries, caution should be taken to avoid the electrical hazard that may be present.

**Special hazards arising from the substrate or mixture**

Fire Incompatibility	None known.
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**Advice for firefighters****Fire Fighting**

- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ Wear breathing apparatus plus protective gloves in the event of a fire.
- ▶ Prevent, by any means available, spillage from entering drains or water courses.
- ▶ Use fire fighting procedures suitable for surrounding area.

	<ul style="list-style-type: none"> <li>▶ <b>DO NOT</b> approach containers suspected to be hot.</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>
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"> <li>▶ Non combustible.</li> <li>▶ Not considered to be a significant fire risk.</li> <li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li> <li>▶ May emit acrid smoke. May emit corrosive and poisonous fumes.</li> </ul>
<b>HAZCHEM</b>	4W

## 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

<b>Minor Spills</b>	<p>Clean up all spills immediately. Avoid contact with skin and eyes. Place in suitable containers for disposal.</p>
<b>Major Spills</b>	<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

<b>Safe handling</b>	<p>Use good occupational work practice. Observe manufacturer's storage and handling recommendations contained within this SDS. Avoid physical damage to containers.  Do not connect the positive terminal to the negative terminal with conductors. Avoid polarity reverse connection when installing the battery to an instrument. Do not mix different type batteries or mix new and old ones together Do not wet the battery or expose to strong oxidizer. Do not open the battery. Keep the battery away from heat and fire. Do not give a mechanical shock or deform. Do not use the unit without its electronic management system. Do not directly heat, solder or throw into fire. Such unsuitable use can cause leakage or spout vaporized electrolyte fumes and may cause fire or explosion. Immediately disconnect the batteries if, during operation, they emit an unusual smell, feel hot, change shape, or appear abnormal in any other way. Keep batteries in original packaging until use and do not jumble them.</p>
<b>Other information</b>	<ul style="list-style-type: none"> <li>▶ Keep dry.</li> <li>▶ Store under cover.</li> <li>▶ Protect containers against physical damage.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> </ul> <p>Keep out of reach of children. Store out of direct sunlight</p> <ul style="list-style-type: none"> <li>▶ Store away from incompatible materials.</li> </ul>

### Conditions for safe storage, including any incompatibilities

<b>Suitable container</b>	Store in original containers.
<b>Storage incompatibility</b>	<ul style="list-style-type: none"> <li>▶ Avoid reaction with oxidising agents</li> <li>▶ Avoid strong acids, acid chlorides, acid anhydrides and chloroformates.</li> </ul>

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### Control parameters

#### OCCUPATIONAL EXPOSURE LIMITS (OEL)

#### INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	copper	Copper, dusts & mists (as Cu)	1 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	copper	Copper (fume)	0.2 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	aluminium	Aluminium (metal dust)	10 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	aluminium	Aluminium (welding fumes) (as Al)	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	aluminium	Aluminium, pyro powders (as Al)	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	biphenyl	Biphenyl	1.3 mg/m3 / 0.2 ppm	Not Available	Not Available	Not Available

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### EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
carbon, non-activated	Carbon; (Graphite, synthetic)	6 mg/m3	16 mg/m3	95 mg/m3
copper	Copper	3 mg/m3	33 mg/m3	200 mg/m3
lithium fluorophosphate	Lithium hexafluorophosphate	7.5 mg/m3	83 mg/m3	500 mg/m3
biphenyl	Diphenyl; (Biphenyl)	0.87 ppm	Not Available	300 ppm

Ingredient	Original IDLH	Revised IDLH
metal oxide or other electrolyte (proprietary)	Not Available	Not Available
carbon, non-activated	Not Available	Not Available
linear & cyclic carbonate solvents	Not Available	Not Available
copper	N.E. mg/m3 / N.E. ppm	100 mg/m3
aluminium	Not Available	Not Available
lithium fluorophosphate	Not Available	Not Available
vinylidene fluoride homopolymer	Not Available	Not Available
styrene butadiene rubber (SBR)	Not Available	Not Available
biphenyl	300 mg/m3	100 mg/m3

### MATERIAL DATA

#### Exposure controls

<b>Appropriate engineering controls</b>	General exhaust is adequate under normal operating conditions.
<b>Personal protection</b>	
<b>Eye and face protection</b>	None under normal operating conditions. <b>OTHERWISE:</b> ▶ Safety glasses.
<b>Skin protection</b>	See Hand protection below
<b>Hands/feet protection</b>	None under normal operating conditions. <b>OTHERWISE:</b> ▶ Rubber Gloves
<b>Body protection</b>	See Other protection below
<b>Other protection</b>	None under normal operating conditions. <b>OTHERWISE:</b> Rubber apron
<b>Thermal hazards</b>	Not Available

#### Respiratory protection

Type A-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	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-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(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- ▶ The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- ▶ Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- ▶ Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- ▶ Use approved positive flow mask if significant quantities of dust becomes airborne.
- ▶ Try to avoid creating dust conditions.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

## Ramset Lithium-ion Batteries - Rechargeable (All Models)

### Information on basic physical and chemical properties

<b>Appearance</b>	Odourless solid.		
<b>Physical state</b>	Manufactured	<b>Relative density (Water = 1)</b>	Not Applicable
<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</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
<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>	Not Applicable	<b>Surface Tension (dyn/cm or mN/m)</b>	Not Applicable
<b>Lower Explosive Limit (%)</b>	Not Applicable	<b>Volatile Component (%vol)</b>	Not Applicable
<b>Vapour pressure (kPa)</b>	Not Applicable	<b>Gas group</b>	Not Available
<b>Solubility in water (g/L)</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>▶ Unstable in the presence of incompatible materials.</li> <li>▶ Product is considered stable.</li> <li>▶ Hazardous polymerisation will not occur.</li> </ul>  Leaked electrolyte may form toxic and corrosive fumes on contact with water.
<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>	Not normally a hazard due to physical form of product.
<b>Ingestion</b>	Not normally a hazard due to physical form of product. Accidental ingestion of the material may be damaging to the health of the individual.
<b>Skin Contact</b>	Not normally a hazard due to physical form of product.  The electrolyte solution can cause skin irritation.
<b>Eye</b>	Not normally a hazard due to physical form of product.  Contents of an opened cell within a battery can cause eye irritation.
<b>Chronic</b>	Not normally a hazard due to physical form of product.  The chemicals in this product are contained in a sealed case and exposure does not occur during normal handling and use. Therefore not chemically dangerous with normal use.

<b>Ramset Lithium-ion Batteries - Rechargeable (All Models)</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>carbon, non-activated</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
<b>copper</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	dermal (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available
	Inhalation (rat) LC50: 0.733 mg/14 h <sup>[1]</sup>	
	Oral (rat) LD50: 300-500 mg/kg <sup>[1]</sup>	
<b>aluminium</b>	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>	Not Available

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lithium fluorophosphate	<b>TOXICITY</b>	<b>IRRITATION</b>
	Oral (rat) LD50: 50-300 mg/kg <sup>[1]</sup>	Not Available
vinylidene fluoride homopolymer	<b>TOXICITY</b>	<b>IRRITATION</b>
	Not Available	Not Available
biphenyl	<b>TOXICITY</b>	<b>IRRITATION</b>
	Dermal (rabbit) LD50: >5010 mg/kg <sup>[2]</sup> Oral (rat) LD50: 2140 mg/kg <sup>[2]</sup>	Eye (rabbit): 100 mg - mild
<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>CARBON, NON-ACTIVATED</b>	Substance has been investigated as a reproductive effector.
<b>COPPER</b>	<p>for copper and its compounds (typically copper chloride):</p> <p><b>Acute toxicity:</b> There are no reliable acute oral toxicity results available. In an acute dermal toxicity study (OECD TG 402), one group of 5 male rats and 5 groups of 5 female rats received doses of 1000, 1500 and 2000 mg/kg bw via dermal application for 24 hours. The LD50 values of copper monochloride were 2,000 mg/kg bw or greater for male (no deaths observed) and 1,224 mg/kg bw for female. Four females died at both 1500 and 2000 mg/kg bw, and one at 1,000 mg/kg bw. Symptom of the hardness of skin, an exudation of hardness site, the formation of scar and reddish changes were observed on application sites in all treated animals. Skin inflammation and injury were also noted. In addition, a reddish or black urine was observed in females at 2,000, 1,500 and 1,000 mg/kg bw. Female rats appeared to be more sensitive than male based on mortality and clinical signs.</p> <p>No reliable skin/eye irritation studies were available. The acute dermal study with copper monochloride suggests that it has a potential to cause skin irritation.</p> <p><b>Repeat dose toxicity:</b> In repeated dose toxicity study performed according to OECD TG 422, copper monochloride was given orally (gavage) to Sprague-Dawley rats for 30 days to males and for 39 - 51 days to females at concentrations of 0, 1.3, 5.0, 20, and 80 mg/kg bw/day. The NOAEL value was 5 and 1.3 mg/kg bw/day for male and female rats, respectively. No deaths were observed in male rats. One treatment-related death was observed in female rats in the high dose group. Erythropoietic toxicity (anaemia) was seen in both sexes at the 80 mg/kg bw/day. The frequency of squamous cell hyperplasia of the forestomach was increased in a dose-dependent manner in male and female rats at all treatment groups, and was statistically significant in males at doses of =20 mg/kg bw/day and in females at doses of =5 mg/kg bw/day doses. The observed effects are considered to be local, non-systemic effect on the forestomach which result from oral (gavage) administration of copper monochloride.</p> <p><b>Genotoxicity:</b> An in vitro genotoxicity study with copper monochloride showed negative results in a bacterial reverse mutation test with Salmonella typhimurium strains (TA 98, TA 100, TA 1535, and TA 1537) with and without S9 mix at concentrations of up to 1,000 ug/plate. An in vitro test for chromosome aberration in Chinese hamster lung (CHL) cells showed that copper monochloride induced structural and numerical aberrations at the concentration of 50, 70 and 100 ug/mL without S9 mix. In the presence of the metabolic activation system, significant increases of structural aberrations were observed at 50 and 70 ug/mL and significant increases of numerical aberrations were observed at 70 ug/mL. In an in vivo mammalian erythrocyte micronucleus assay, all animals dosed (15 - 60 mg/kg bw) with copper monochloride exhibited similar PCE/(PCE+NCE) ratios and MNPCE frequencies compared to those of the negative control animals. Therefore copper monochloride is not an in vivo mutagen.</p> <p><b>Carcinogenicity:</b> there was insufficient information to evaluate the carcinogenic activity of copper monochloride.</p> <p>Reproductive and developmental toxicity: In the combined repeated dose toxicity study with the reproduction/developmental toxicity screening test (OECD TG 422), copper monochloride was given orally (gavage) to Sprague-Dawley rats for 30 days to males and for 39-51 days to females at concentrations of 0, 1.3, 5.0, 20, and 80 mg/kg bw/day. The NOAEL of copper monochloride for fertility toxicity was 80 mg/kg bw/day for the parental animals. No treatment-related effects were observed on the reproductive organs and the fertility parameters assessed. For developmental toxicity the NOAEL was 20 mg/kg bw/day. Three of 120 pups appeared to have icterus at birth; 4 of 120 pups appeared runted at the highest dose tested (80 mg/kg bw/day).</p> <p>WARNING: Inhalation of high concentrations of copper fume may cause "metal fume fever", an acute industrial disease of short duration. Symptoms are tiredness, influenza like respiratory tract irritation with fever.</p>
<b>BIPHENYL</b>	<p>The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis for biphenyl:</p> <p>Biphenyl is well absorbed through the gastrointestinal tract and presumably also via lung and skin. In those species examined, the metabolites of biphenyl, mainly 4-hydroxybiphenyl, are excreted rapidly and almost exclusively in the urine. The acute oral toxicity of biphenyl is moderate. It is non-irritating to skin and only slightly irritating to the eyes. There is no evidence of dermal sensitization. Subchronic exposure by inhalation caused bronchopulmonary changes</p> <p>In toxicological studies in which rodents have been administered diets containing biphenyl for various periods of time, effects on the urinary system have often been reported. A marked increase in the incidence of morphological (i.e. formation of calculi) and/or histopathological (e.g. hyperplasia, desquamation) effects has been observed within the urinary tract of male rats administered diets containing more than 2500 mg biphenyl/kg for periods ranging from 32 to 104 weeks. An increase in the occurrence of calculi within the urinary bladder has also been observed in female rats, but at a lower incidence than in males. Similarly, in a long-term dietary study, increased squamous metaplasia within the urinary transitional epithelium was also observed in female rats; again, however, the incidence was lower than that observed in males. In male mice, only 1 of 10 animals given a diet containing 10 000 mg biphenyl/kg (1500 mg/kg body weight per day) for 32 weeks developed simple hyperplasia and papillary or nodular dysplasia of the urinary bladder. Effects on blood chemistry and haematological parameters have also been observed in animals administered biphenyl orally; these effects occurred in male and female rats and mice at intakes lower than those associated with the development of effects in the urinary bladder of male rats administered biphenyl. For non-neoplastic effects, the LOEL was 38 mg/kg body weight per day based upon the development of alterations in haematological parameters (i.e. decreased haemoglobin concentration and haematocrit) in rats fed diets containing 0, 500, 1500, or 4500 mg biphenyl/kg (reported intakes of 0, 38, 113, or 338 mg/kg body weight per day) for 2 years.</p> <p>Available information indicates that biphenyl has no reproductive or developmental effects at doses lower than those associated with the development of adverse effects in the parental generation.</p> <p>An increased incidence of benign and malignant tumours within the urinary bladder was observed in male F344/DuCrj rats administered diets containing high levels (i.e. not less than 4500 mg/kg) of biphenyl for 2 years. Tumour incidence was not increased in female rats or in male or female Crj:BDF1 mice. In female mice, there were slight increases in the incidences of benign and malignant liver tumours in animals receiving biphenyl in the diet; however, the results were not dose dependent over the entire range of concentrations tested. In other studies, biphenyl exhibited tumour-promoting activity with respect to the development of bladder neoplasms in male rats but not in male mice</p> <p><i>In vitro</i> studies with bacteria have provided no evidence of mutagenic potential for biphenyl; with <i>Saccharomyces cerevisiae</i> D7, gene mutation and mitotic recombination were observed with or without metabolic activation. However, genetic toxicology testing in mammalian cells has produced positive results in the presence of metabolic activation and negative results in the absence of metabolic activation.</p> <p>Neoplastic by RTECS criteria.</p>
<b>ALUMINIUM &amp; LITHIUM FLUOROPHOSPHATE &amp; VINYLIDENE FLUORIDE HOMOPOLYMER</b>	No significant acute toxicological data identified in literature search.
<b>LITHIUM FLUOROPHOSPHATE &amp; BIPHENYL</b>	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes

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to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. 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. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Acute Toxicity	☒	Carcinogenicity	☒
Skin Irritation/Corrosion	☒	Reproductivity	☒
Serious Eye Damage/Irritation	☒	STOT - Single Exposure	☒
Respiratory or Skin sensitisation	☒	STOT - Repeated Exposure	☒
Mutagenicity	☒	Aspiration Hazard	☒

**Legend:** ✗ – Data available but does not fill the criteria for classification  
✔ – Data available to make classification  
☒ – Data Not Available to make classification

## SECTION 12 ECOLOGICAL INFORMATION

### Toxicity

Ramset Lithium-ion Batteries - Rechargeable (All Models)	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
carbon, non-activated	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
copper	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.0028mg/L	2
	EC50	48	Crustacea	0.001mg/L	5
	EC50	72	Algae or other aquatic plants	0.013335mg/L	4
	BCF	960	Fish	200mg/L	4
	EC25	6	Algae or other aquatic plants	0.00150495mg/L	4
aluminium	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	0.078-0.108mg/L	2
	EC50	48	Crustacea	0.7364mg/L	2
	EC50	96	Algae or other aquatic plants	0.0054mg/L	2
	BCF	360	Algae or other aquatic plants	9mg/L	4
	NOEC	72	Algae or other aquatic plants	>=0.004mg/L	2
lithium fluorophosphate	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	42mg/L	2
NOEC	168	Crustacea	2.55mg/L	2	
vinylidene fluoride homopolymer	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
biphenyl	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	1.45mg/L	4
	EC50	48	Crustacea	0.73mg/L	4
	BCF	24	Algae or other aquatic plants	0.05mg/L	4
NOEC	48	Crustacea	0.04mg/L	4	

**Legend:** *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 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*

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

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

### Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
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Continued...

## Ramset Lithium-ion Batteries - Rechargeable (All Models)

vinylidene fluoride homopolymer	LOW	LOW
biphenyl	LOW (Half-life = 14 days)	LOW (Half-life = 4.58 days)

### Bioaccumulative potential

Ingredient	Bioaccumulation
vinylidene fluoride homopolymer	LOW (LogKOW = 1.24)
biphenyl	MEDIUM (LogKOW = 3.98)

### Mobility in soil

Ingredient	Mobility
vinylidene fluoride homopolymer	LOW (KOC = 35.04)
biphenyl	LOW (KOC = 6250)

## SECTION 13 DISPOSAL CONSIDERATIONS

### Waste treatment methods

Product / Packaging disposal	
	<ul style="list-style-type: none"> <li>▶ Recycle wherever possible or consult manufacturer for recycling options.</li> <li>▶ Consult State Land Waste Management Authority for disposal.</li> <li>▶ Bury residue in an authorised landfill.</li> <li>▶ Recycle containers if possible, or dispose of in an authorised landfill.</li> </ul>

## SECTION 14 TRANSPORT INFORMATION

### Labels Required

	
Marine Pollutant	NO
HAZCHEM	4W

### Land transport (ADG)

UN number	3480				
UN proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)				
Transport hazard class(es)	<table border="0"> <tr> <td>Class</td> <td>9</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table>	Class	9	Subrisk	Not Applicable
Class	9				
Subrisk	Not Applicable				
Packing group	Not Applicable				
Environmental hazard	Not Applicable				
Special precautions for user	<table border="0"> <tr> <td>Special provisions</td> <td>188 230 310 348 376 377 384</td> </tr> <tr> <td>Limited quantity</td> <td>0</td> </tr> </table>	Special provisions	188 230 310 348 376 377 384	Limited quantity	0
Special provisions	188 230 310 348 376 377 384				
Limited quantity	0				

### Air transport (ICAO-IATA / DGR)

UN number	3480														
UN proper shipping name	Lithium ion batteries (including lithium ion polymer batteries)														
Transport hazard class(es)	<table border="0"> <tr> <td>ICAO/IATA Class</td> <td>9</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>9F</td> </tr> </table>	ICAO/IATA Class	9	ICAO / IATA Subrisk	Not Applicable	ERG Code	9F								
ICAO/IATA Class	9														
ICAO / IATA Subrisk	Not Applicable														
ERG Code	9F														
Packing group	Not Applicable														
Environmental hazard	Not Applicable														
Special precautions for user	<table border="0"> <tr> <td>Special provisions</td> <td>A88 A99 A154 A164 A183 A201 A206 A331</td> </tr> <tr> <td>Cargo Only Packing Instructions</td> <td>See 965</td> </tr> <tr> <td>Cargo Only Maximum Qty / Pack</td> <td>See 965</td> </tr> <tr> <td>Passenger and Cargo Packing Instructions</td> <td>See 965</td> </tr> <tr> <td>Passenger and Cargo Maximum Qty / Pack</td> <td>See 965</td> </tr> <tr> <td>Passenger and Cargo Limited Quantity Packing Instructions</td> <td>Forbidden</td> </tr> <tr> <td>Passenger and Cargo Limited Maximum Qty / Pack</td> <td>Forbidden</td> </tr> </table>	Special provisions	A88 A99 A154 A164 A183 A201 A206 A331	Cargo Only Packing Instructions	See 965	Cargo Only Maximum Qty / Pack	See 965	Passenger and Cargo Packing Instructions	See 965	Passenger and Cargo Maximum Qty / Pack	See 965	Passenger and Cargo Limited Quantity Packing Instructions	Forbidden	Passenger and Cargo Limited Maximum Qty / Pack	Forbidden
Special provisions	A88 A99 A154 A164 A183 A201 A206 A331														
Cargo Only Packing Instructions	See 965														
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Passenger and Cargo Packing Instructions	See 965														
Passenger and Cargo Maximum Qty / Pack	See 965														
Passenger and Cargo Limited Quantity Packing Instructions	Forbidden														
Passenger and Cargo Limited Maximum Qty / Pack	Forbidden														



**Sea transport (IMDG-Code / GGVSee)**

<b>UN number</b>	3480	
<b>UN proper shipping name</b>	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	
<b>Transport hazard class(es)</b>	IMDG Class	9
	IMDG Subrisk	Not Applicable
<b>Packing group</b>	Not Applicable	
<b>Environmental hazard</b>	Not Applicable	
<b>Special precautions for user</b>	EMS Number	F-A , S-I
	Special provisions	188 230 310 348 376 377 384
	Limited Quantities	0

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

Not Applicable

**SECTION 15 REGULATORY INFORMATION****Safety, health and environmental regulations / legislation specific for the substance or mixture****CARBON, NON-ACTIVATED(7440-44-0) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Inventory of Chemical Substances (AICS)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft

**COPPER(7440-50-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Exposure Standards

Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

**ALUMINIUM(7429-90-5) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Exposure Standards

Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

**LITHIUM FLUOROPHOSPHATE(21324-40-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Inventory of Chemical Substances (AICS)

**VINYLDENE FLUORIDE HOMOPOLYMER(24937-79-9) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Inventory of Chemical Substances (AICS)

**BIPHENYL(92-52-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS**

Australia Exposure Standards

Australia Hazardous Substances Information System - Consolidated Lists

Australia Inventory of Chemical Substances (AICS)

National Inventory	Status
Australia - AICS	Y
Canada - DSL	N (lithium fluorophosphate)
Canada - NDSL	N (vinylidene fluoride homopolymer; copper; aluminium; biphenyl; carbon, non-activated)
China - IECSC	Y
Europe - EINEC / ELINCS / NLP	N (vinylidene fluoride homopolymer)
Japan - ENCS	N (copper; aluminium; carbon, non-activated; lithium fluorophosphate)
Korea - KECI	Y
New Zealand - NZIoC	N (lithium fluorophosphate)
Philippines - PICCS	Y
USA - TSCA	Y
<b>Legend:</b>	Y = All ingredients are on the inventory N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)

**SECTION 16 OTHER INFORMATION****Other information****Ingredients with multiple cas numbers**

Name	CAS No
carbon, non-activated	7440-44-0, 82600-58-6
copper	7440-50-8, 133353-46-5, 133353-47-6, 195161-80-9, 65555-90-0, 72514-83-1
aluminium	7429-90-5, 91728-14-2

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.

Continued...

**Ramset Lithium-ion Batteries - Rechargeable (All Models)**

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  
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

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