Material/Product Safety Data Sheet
(MSDS/PSDS)

Model/Capacity:	DC1048	**Lithium-Ion single cells and Battery Pack**
Revision:	01	
Date:	2016-Sep-4	

1. Identification of the Substance or Preparation and Company

Product	**Rechargeable lithium-ion single cells and battery packs Soft Pack**
Production sites	Company name: ELECTUS DISTRIBUTION
	Address: 320 Victoria Road Rydalmere NSW 2116 Australia
	Tel: 1300 738 555 Fax: 1300 738 500
	Website: www.electusdistribution.com.au

2. Composition and Information on Ingredients

Each cell consists of a hermetically sealed laminated foil containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release. There is no potential for exposure to these ingredients unless the cell leaks, or opens, following high temperature, mechanical or electrical abuse.

Ingredient	Content* (wt. %)	CAS #	ACGIH (TLV)	OSHA (PEL)	Special Risk	Safety Advice
$LiCoO_2$ *(Lithium cobalt oxide)* LiNiCoMnO2 (*Lithium NCM oxide*)	35%	12190-79-3 12031-65-1 12162-79-7	0.02 mg/m3 8 hours 0.2 mg/m3 8 hours 0.02 mg/m3 8 hours as dust and fumes	5 mg/m^3 as dust/fumes	R22 R43	S2 S22 S24 S26 S36 S37 S45
Graphite and Carbon	25%	7782-42-5 1333-86-4	3.5 mg/m^3,	2.0 mg/m^3, as dust	R22	S22
$LiPF_6$ *(Lithium Hexafluoride phosphate)*	≈3.0%	21324-40-3	None established	None established	R14	S2 S8 S22 S24 S26 S36
EC	5%	96-49-1	None established	None established	R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45
EMC	5%	623-53-0	None established	None established	R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45
DMC	5%	616-38-6	None established	None established	R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45
Copper*(Cu)*	10%	7440-50-8	0.2 mg/m^3 as fume 1.0 mg/m^3 as dust/mist	0.1 mg/m^3 as fume 1.0 mg/m^3 as dust/mist	------	------
Aluminum*(Al)*	5 %	7429-90-5	10.0 mg/m^3 as dust,	2.0 mg/m^3, as soluble salt	------	------
Nickel(Ni)	2%	7440-02-0	0.2 mg/m^3 as fume 1.0 mg/m^3 as dust/mist	0.1 mg/m^3 as fume 1.0 mg/m^3 as dust/mist	------	------
			,	3	R22	S22
SBR	1 %	9003-55-8	10.0 mg/m3, as dust	2.0 mg/m3, as soluble salt	R22	S22
Others	3%	------	------	------	------	------

* Quantities may vary a little with cell model

ACGIH: American Council of Governmental Industrial Hygienists
TLV: Threshold Limit Value is personal exposure limit, determined y ACGIH.

Note1. Name of Special Risks:
R14/15 Reacts with water and yields flammable gases
R21 Harmful in contact with skin
R22 Harmful if swallowed
R35 Causes severe burns
R41 Risk of serious damage to the eye
R42/43 May cause sensitization by inhalation and skin contact
R43 May cause sensitization by skin contact

Note2. Safety Advices:
S2 Keep out of reach from children
S8 Keep away from moisture
S22 Do not breathe dust
S24 Avoid contact with skin
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical attention
S36 Wear suitable protective clothing
S37 Wear suitable gloves
S45 In case of incident, seek medical attention

3. Hazards Identification

The rechargeable lithium-ion batteries described in this Product Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer and as long as their integrity is maintained.

However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released.

Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

- Most important hazard and effects

Human health effects:

Inhalation: The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.
Skin contact: The steam of the electrolyte stimulates a skin. The electrolyte skin contact causes a sore and stimulation on the skin.
Eye contact: The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and stimulation on the eye. Especially, substance that causes a strong inflammation of the eyes is contained.

Environmental effects: Since a battery cell remains in the environment, do not throw out it into the environment.

- Specific hazards:

If the electrolyte contacts with water, it will generate detrimental hydrogen fluoride.
Since the leaked electrolyte is inflammable liquid, do not bring close to fire.

4. First Aid Measures (in case of leaking or accidentally opened cells)

In case of accumulator breakage or rupture, please evacuate employees from the contaminated area and ensure maximal ventilation in order to break-up corrosive gas, smoke and unpleasant odors.
If it occurs, by accident, following measures must be taken:

Inhalation	Not anticipated under normal use. Remove to fresh air and ventilate the contaminated area. Keep the victim blow his/her nose, gargle. In severe cases obtain medical attention.
Skin contact	Not anticipated under normal use. Wash off skin thoroughly with water. Remove contaminated clothing and wash before reuse. In severe cases obtain medical attention.
Eye contact	Not anticipated under normal use. Irrigate thoroughly with water for at least 15 minutes. Obtain medical attention.
Ingestion	Not anticipated under normal use. Wash out mouth thoroughly with water and give plenty of water to drink. Obtain medical attention.
Further treatment	All cases of eye contamination, persistent skin irritation and casualties who have swallowed this substance or been affected by breathing its vapors should be seen by a doctor.

5. Fire Fighting Measures

Suitable extinguishing media: Plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.

- Specific hazards: Corrosive gas may be emitted during fire.
- Specific methods of fire-fighting: When the battery burns with other combustibles simultaneously, take fire extinguishing. method which correspond to the combustibles. Extinguish a fire from the windward as much as possible.
- Special protective equipment for firefighters:
  Respiratory protection: Respiratory equipment of a gas cylinder style or protection-against-dust mask
  Hand protection: Protective gloves
  Eye protection: Goggle or protective glasses designed to protect against liquid splashes
  Skin and body protection: Protective cloth.

6. Accidental Release Measures

Spilled internal cell materials, such as electrolyte leaked from a battery cell, are carefully dealt with according to the followings.

- Precautions for human body:
  Remove spilled materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.
- Environmental precautions: Do not throw out into the environment.
- Method of cleaning up: The spilled solids are put into a container. The leaked place is wiped off with dry cloth.
- Prevention of secondary hazards: Avoid re-scattering. Do not bring the collected materials close to fire.

7. Handling and Storage

Handling	Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods, which would end up into excessive heating. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non conductive (i.e. plastic) trays. Do not disassemble, mutilate or mechanically abuse cells and batteries.
Storage	Store in a cool (preferably below 30°C) and ventilated area, away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 140°C may result in battery leakage and rupture. Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.
Other	Follow Manufacturers recommendations regarding maximum recommended currents and operating temperature range. Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation. Do not immerse in water. Connecting to inappropriate power supplies can result in fire or explosion.

8. Exposure Controls & Personal Protection

Occupational exposure standard	See section 2
Respiratory protection	In all fire situations, use self-contained breathing apparatus.
Hand protection	In the event of leaking or ruptured cells, wear gloves.
Eye protection	Safety glasses are recommended in case of leaking or ruptured cells
Other	In the event of leakage or ruptured cells, wear chemical apron.

9. Physical and Chemical Properties

Note: The following points are not applicable unless in case of leaking or damaged batteries with internal components sipping out.

Appearance	Soft squares, Silver color with tab lead Aluminum/Nickel for Positive and only Nickel
Odour	Odourless (unless in case of damaged product with leaking electrolyte)
pH	Not applicable
Flash point	Not applicable
Flammability	Not applicable
Density	Not applicable
Temperature range	+45 max in storage, -10°C ~ 45°C within operating
Solubility, with solvent(s)	Insoluble in water

10. Stability and Reactivity

The product is stable under conditions described in Section 7.

Conditions to avoid.	Heating above 100°C or incinerate. Deformation. Mutilation. Crushing. Piercing. Disassembly. Short circuiting. Exposition over a long period to humid conditions.
Materials to avoid	Conductive materials, water, seawater, strong oxidizers and strong acids.
Hazardous decomposition Products	HF, CH4, CO_2

11. Toxicological Information

Signs & symptoms	None, unless battery ruptures. In the event of leakage to internal contents, corrosive fumes will be very irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.
Inhalation	Lung irritant.
Skin contact	Skin irritant
Eye contact	Eye irritant.
Ingestion	Tissue damage to throat and gastro-respiratory tract if swallowed.
Medical conditions generally aggravated by exposure	In the event of exposure to internal contents, eczema, skin allergies, lung injuries, asthma and other respiratory disorders may occur.

12. Ecological Information

- Persistence/degradability:

  Since a battery cell and the internal materials remain in the environment, do not bury or throw out into the environment.

13. Disposal Considerations

- Recommended methods for safe and environmentally preferred disposal:

Product (waste from residues)

Do not throw out a used battery cell. Recycle it through the recycling company.

Contaminated packaging

Neither a container nor packing is contaminated during normal use. When internal materials leaked from a battery cell contaminates, dispose as industrial wastes subject to special control.

14. Transport Information

In the case of transportation, avoid exposure to high temperature and prevent the formation of any condensation. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet by rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a cell. Please refer to Section 7-HANDLING AND STORAGE also.

UN regulation

- ID number: 3480 (or 3481)
- Proper shipping name:
  "Lithium ion batteries" (or "Lithium ion Batteries packed with equipment" or "Lithium ion Batteries contained in equipment")
- Class: 9
- Packing group:
- However this product is defined as above, it is not recognized as "DANGEROUS GOODS" when its transport condition accords with instructions or provisions depend on region and transportation mode.
- All cells and batteries must successfully meet the requirements in accordance with the UN Manual of Tests and Criteria Part ... Subsection 38.3

Regulation depends on region and transportation mode

- Worldwide, air transportation:
  IATA-DGR ["packing instruction 965 section II" (or "packing instruction 966 section II" or "packing instruction 967 section II")
- Worldwide, sea transportation:
  IMO-IMDG Code [special provision 188]
- Europe, road transportation:
  ADR [special provision 188]

15. Regulatory Information

Regulations specifically applicable to the product:

- ACGIH and OSHA: see exposure limits of the internal ingredients of the battery in section 2.
- IATA/ICAO (air transportation): UN 3480 or UN 3481
- IMDG (sea transportation) : UN 3480 or UN 3481
- Transportation within the US-DOT, 49 Code of Federal Regulations

16. Other information

- This safety data sheet is offered an agency who handles this product to handle it safely.
- The agency should utilize this safety data sheet effectively (put it up, educate person in charge) and take proper measures.
- The information contained in this Safety data sheet is based on the present state of knowledge and current legislation.
- This safety data sheet provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.

Reference

International Chemical Safety Cards (ICSCs): International Occupational Safety and Health Information Centre (CIS)
2002 TLVs and BEIs: American Conference of Governmental Industrial Hygienists (ACGIH)
Dangerous Goods Regulations – 57th Edition Effective 1 January 2016: International Air Transport Association (IATA)
IMDG Code -35-10 Edition: International Maritime Organization (IMO)
The European Agreement concerning the International Carriage of Dangerous Goods by Road - 2011: The United Nations Economic Commission for Europe (UNECE)
RTECS (CD-ROM)
MSDS of raw materials prepared by the manufactures