Arlec Australia Limited **TECHNOTE**

ABN 25 003 118 787

MATERIAL SAFETY DATA SHEET – LITHIUM ION BATTERIES

Technote 49	Rev 01	2 February 2016

STATEMENT OF HAZARDOUS NATURE

Not classified as hazardous, Not classified as dangerous according to Worksafe Australia criteria.

COMPANY DETAILS

Manufactured for:

Arlec Australia Pty Ltd (ACN 009 322 105)
Building 3, 31-41 Joseph St
Blackburn North Vic 3130
PO Box 1065
Blackburn North Vic 3130

IDENTIFICATION

Product Name: Lithium Ion Battery

Manufacturer's Product Code: 18650 size and similar cylindrical cells of varying capacity
UN Number/s: 3480, 3481
Dangerous Goods Class and Subsidiary Risk: 9-Miscellaneous Dangerous Goods
Hazchem Code: 4W
Packing Group: II
Poisons Schedule Number: None
Use: Energy source
Chemical System: Lithium Ion

Physical Description/Properties

Appearance: Various shaped battery sizes.

Boiling Point/Melting Point:	Not available	***Flashpoint:***	Not available
Vapour Pressure:	Not available	***Flammability Limits:***	Not available
Specific Gravity:	Not available	***Solubility in Water:***	Not applicable

Other Properties:

Ingredients*:

Chemical Name:	*CAS Number:*	*% by weight*
Carbon Black	1333-86-4	0-2
Biphenyl	92-52-4	0-15
Diethyl Carbonate	105-58-8	0-15
Dimethyl Carbonate	616-38-6	0-15
Ethylmethyl Carbonate	623-53-0	0-15
Ethylene Carbonate	96-49-1	0-15
Graphite	7782-42-5	7-22
Lithium Cobalt Oxide	12190-79-3	15-30

Lithium Hexafluorophosphate	21324-40-3	0-5
Lithium Tetrafluoroborate	14283-07-9	0-5
N-Methyl Pyrrolidinone	872-50-4	0-1
Oxalic Acid	144-62-7	0-1
Propylene Carbonate	108-32-7	0-15

HEALTH HAZARD INFORMATION

These chemicals are contained in a sealed container. For consumer use, adequate hazard warnings are included on both the package and on the battery. Potential for exposure should not exist unless the battery leaks, is exposed to high temperatures or is mechanically, physically, or electrically abused.

First Aid:

Ingestion: Swallowing a battery can be harmful.
Can cause serious chemical burns of mouth, oesophagus, and gastrointestinal tract.
If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

Inhalation: Contents of an open battery can cause respiratory irritation. Provide fresh air and seek medical attention.

Skin Absorption: N-methyl pyrrolidinone, ethylene carbonate, ethyl methyl carbonate, dimethyl carbonate, and biphenyl may be absorbed through the skin, causing localized inflammation.

Skin Contact: Contents of an open battery can cause skin irritation and/or chemical burns. Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

Eye Contact: Contents of an open battery can cause severe irritation and chemical burns. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

Note: Carbon black and cobalt compounds are listed as a possible carcinogen by International Agency for Research on Cancer (IARC).

First Aid Facilities: Not applicable for normal consumer use. For warehouse/storage facilities have an eyewash and safety shower available in case batteries leak or rupture.

PRECAUTIONS FOR USE

Exposure Standards: 8-Hour TWA's:

Carbon Black	3.5mg/ m^3 (as Carbon Black) (OSHA & ACGIH)	
	(OSHA)	(ACGIH)
Biphenyl	1mg/ m^3 (0.2ppm)	0.2ppm
Diethyl Carbonate	None established	None established
Dimethyl Carbonate	None established	None established
Ethylmethyl Carbonate	None established	None established
Ethylene Carbonate	None established	None established
Graphite	5mg/m^3 (respirable fraction) 15mg/ m^3 (total dust)	2mg/ m^3 (respirable fraction)
Lithium Cobalt Oxide	0.1mg/ m^3 (as Co)	0.2mg/ m^3 (as Co)
Lithium Hexafluorophosphate	None established	None established
Lithium Tetrafluoroborate	None established	None established
N-Methyl Pyrrolidinone	None established	None established
Oxalic Acid	1mg/ m^3	1mg/ m^3
Propylene Carbonate	None established	None established

These levels are not anticipated under normal consumer use conditions.

Engineering Controls: General ventilation under normal use conditions.

Personal Protection: None under normal use conditions. Wear safety glasses and neoprene, rubber or latex gloves when handling open or leaking batteries. Avoid exposure to fumes from open or leaking batteries.

Fire and Explosion Hazard Data: If fire or explosion occurs when batteries are on charge, shut off power to charger. In case of fire where lithium ion batteries are present, flood the area with water. If any batteries are burning, water may not extinguish them, but will cool the adjacent batteries and control the spread of fire. CO2, dry chemical, and foam extinguishers are preferred for small fires, but also may not extinguish burning lithium ion batteries. Burning batteries will burn themselves out. Virtually all fires involving lithium ion batteries can be controlled with water. When water is used, however, hydrogen gas may be evolved which can form an explosive mixture with air. LITH-X (powdered graphite) or copper powder fire extinguishers, sand, dry ground dolomite or soda ash may also be used. These materials act as smothering agents. Fire fighters should wear self-contained breathing apparatus. Burning lithium ion batteries can produce toxic fumes including HF, oxides of carbon, aluminum, lithium, copper, and cobalt. Volatile phosphorus pentafluoride may form at a temperature above 110ºC (230ºF).

SAFE HANDLING INFORMATION

Storage: Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life. In locations that handle large quantities of lithium batteries, such as warehouses, lithium batteries should be isolated from unnecessary combustibles.

Mechanical Containment: Do not obstruct safety release vents on batteries. Encapsulation of batteries will not allow cell venting and can cause high pressure rupture.

Handling: Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, generate significant heat and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewellery, metal covered tables or metal belts used for assembly of batteries into devices. Damaging a lithium battery may result in an internal short circuit.
The contents of an open battery, including a vented battery, when exposed to water, may result in a fire and/or explosion. Crushed or damaged batteries may result in a fire.
If soldering or welding to the battery is required, consult your Arlec representative for proper precautions to prevent seal damage or short circuit.

Charging: This battery is made to be charged many times. Use an approved battery charger. Never use a modified or damaged battery charger. Do not charge for over 180 minutes or repeat charging without intermittent discharging. A backup charge termination based on time is recommended to prevent overcharging. The charging temperature should be between 0°C and 50°C (32°F and 120°F). The battery pack will normally warm during charging.

Disposal: Dispose in accordance with all applicable federal, state and local regulations.

TRANSPORT:

Classification – Class 9 – Miscellaneous Dangerous Goods

Lithium Ion batteries can be shipped by air when in accordance with International Civil Aviation Organization (ICAO), 2015-2016 edition requirements or International Air Transport Association (IATA) DGR 57th edition, Section II or Section 1 Packing Instructions (PI) 966 (Lithium-Ion Batteries, packed with equipment), (PI) 967 (Lithium-Ion Batteries, contained in equipment or Section 1A Packing Instructions (PI) 965 (Lithium-Ion Batteries), as appropriate.

Lithium Ion batteries are regulated by the International Maritime Organization (IMO), 2010, 35th amendment, under Special Provisions 188 and 230.

Lithium Ion cells / batteries are not restricted for Australian road transport where they meet the requirements of ADG SP188

Lithium Ion cells are tested and comply with the UN Model Regulations, Manual of Test and Criteria, Part III, subsection 38.3.

Lithium Ion batteries are not subject to the requirements of the US Department of Transportation (DOT) Subchapter C, Hazardous Materials Regulations if shipped in compliance with 49 CFR 173.185, Special Provision 188 & State Variation USG-02.

By complying with the requirements specified above, Lithium Ion Batteries are not otherwise regulated by international agencies as hazardous materials or dangerous goods when shipped.

MARKING:

It is Arlec policy that when these batteries are provided to consumers, the following warning information is provided on the instruction sheet of the accompanying product or as a separate information sheet:

If the Arlec label or package warnings are not visible, it is important to provide a package and/or device label stating: WARNING: CHARGE ONLY WITH SPECIFIED CHARGERS ACCORDING TO DEVICE MANUFACTURER'S INSTRUCTIONS. DO NOT OPEN BATTERY, DISPOSE OF IN FIRE, OR SHORT CIRCUIT - MAY IGNITE, EXPLODE, LEAK, OR GET HOT CAUSING PERSONAL INJURY.

OTHER INFORMATION:

CONTACT POINT: Australian Poisons Information Centre
24 hour service: -13 11 26
Police or Fire Brigade: -000 (exchange): -1100

New Zealand Poisons Information Centre
Dunedin: -(03)479 1200 (Normal hours)
-(03)474 0999 (Emergency)

Prepared by: M. Nimmervoll Date:3-02-2016