Lithium Ion Battery Fact Sheet

For Li-ion Cells or Battery Packs

HAZARDS

The battery cell/pack is designed to withstand normal handling and use and poses no chemical hazard under normal use. Exposure to hazardous substances could occur only if the battery pack or cells have been opened, disassembled, crushed, burned, exposed to high temperatures > 150°C (302°F), submerged, or subjected to other types of abuse. Avoid exposure to heat, open flame, and corrosives. Do not puncture, crush or incinerate. This is an electrical energy storage device. Avoid situations that could cause arcing between terminals or short-circuiting. The device may cause electrical shock, fire or injury.

Note: Liquid-cooled batteries may contain DEX-COOL or equivalent coolant. See DEX-COOL or equivalent coolant Safety Data Sheet for information on potential health effects associated with exposure. DEX-COOL SDSs can be found online.

FIRST AID

Electrical Shock: In the event of individual electric shock, do not touch the person with bare hands while he or she is still in contact with the battery. Use an object that does not conduct electricity to break contact or push person away from the battery. Check for signs of circulation, such as normal breathing, coughing, or movement in response to stimulation. Contact the emergency medical system immediately. If necessary, start cardiopulmonary resuscitation (CPR) if the person stops breathing.

Decomposition Products: May rupture or explode in a fire, which could release hydrogen, hydrogen fluoride, carbon monoxide, carbon dioxide, aldehydes, and short chain hydrocarbons. Overexposure to products generated from overcharge or combustion of the cell or battery may result in simple and chemical asphyxiation. Symptoms may include rapid respiration, muscular incoordination, fatigue, dizziness, nausea, vomiting, unconsciousness, and death. Severe eye irritation or tissue injury may occur at high concentrations. Prolonged overexposure to decomposition products may adversely affect the lungs, blood, cardiovascular, and central nervous system. Symptoms may include headache, confusion, excitation, rapid breathing, an irregular heartbeat, weakness, exhaustion, cyanosis (bluish or purplish tinge to the skin), and chest pain.

Cell/Electrolyte Mixture: The following actions are recommended if direct contact occurs with electrolyte mixture due to damage of battery pack or cells:

Inhalation	**:**	High vapor concentrations may cause respiratory tract irritation. Leave area immediately and seek medical attention if irritation occurs.
Eye contact	**:**	Eye contact may cause severe irritation and possibly a burning sensation or corneal tissue injury. Rinse eyes with water for 30 minutes and seek medical attention immediately.
Skin contact	**:**	Skin contact may cause irritation. Prolonged contact with electrolyte mixture may result in more severe irritation. Wash area thoroughly with soap and water and seek medical attention if irritation occurs.
Ingestion	**:**	Swallowing electrolyte mixture may cause gastrointestinal tract burns. May cause nausea and vomiting. Do not give anything by mouth to a victim who is either unconscious or is losing consciousness. If swallowed, rinse mouth with water and have victim spit the wash water out. Repeat. Do NOT induce vomiting. If vomiting occurs naturally, have victim lean forward to avoid aspiration. Call poison control center immediately

FIRE FIGHTING

Suitable Extinguishing Media	**:**	*Small Fire:* Use ABC fire extinguisher or water spray. *Large Fire:* Use copious amounts of water spray or fog.

Unsuitable Extinguishing Media	:	Do not use extinguisher containing metal (Class D, type II extinguisher).
Over-Voltage Response	:	Move battery cell(s) or pack to safe area isolated from other combustible materials, if possible. Monitor battery to ensure temperature is stable. If heated above 150°C (302°F), battery or cell/electrolyte mixture may burst or rupture or vent.
Fire/Explosion Response	:	If possible, remove any unaffected battery packs or cells from fire-fighting area. For fires involving battery packs – individual cell fires may occur over a period of several seconds rather than simultaneously. Allow battery cell(s) or pack to cool to ambient temperature before approaching or handling. Isolate all energy sources to battery cell/pack. Keep pack isolated in a well-ventilated area until a thorough inspection of the battery can be performed.
Firefighting Equipment	:	Use NIOSH-approved full-face Self-Contained Breathing Apparatus (SCBA) with full protective gear.

ACCIDENTAL RELEASE

Personal Precautions :

- Follow local emergency response plan for emergency events.
- Restrict access to the area.
- Attempt to ventilate area, if possible.
- For battery over-voltage, turn off power to recharge points.
- Isolate energy sources / eliminate ignition sources.
- Remove all metal objects including rings, watches, belts, etc. before handling battery cells or packs.
- Allow battery to cool to ambient temperature before approaching.
- Measure temperature remotely with an infrared temperature (IR) gun or similar device.
- Prevent skin and eye contact or inhalation of vapors.
- Wear neoprene or nitrile rubber gloves and safety glasses/side shields when handling damaged battery cells or packs.

Environmental Precautions	:	Prevent entry of cell/electrolyte mixture into drains, surface water, or groundwater. Contact local fire/police department.
Methods for Containment and Clean-up (Release of Cell/Electrolyte Mixture)	:	Leave area and allow any vapor to dissipate. Prevent skin and eye contact or inhalation of vapor. Use personal protective equipment (PPE) including safety glasses and chemical resistant neoprene or nitrile gloves; if vapor is present and cannot be ventilated use respiratory protection. Neutralization is not necessary. For small releases, use paper towel or dry cloth to absorb electrolyte. For larger releases, clean up all spills/leaks immediately using an inert absorbent (vermiculite, cat litter, dry sand). Place contaminated sorbent in appropriate container and dispose of waste in accordance with local regulations. After removing the battery/cell and absorbent material, clean area with soap and water.

PERSONAL PROTECTION

Respirator	:	Not required during normal operations. Self-Contained Breathing Apparatus (SCBA) required in the event of fire/explosion or over-voltage.
Eye/face protection	:	Not required beyond safety practices of employer.
Gloves	:	Not required for handling of cells or battery pack.
Foot protection	:	Steel-toed shoes are recommended when it is necessary to handle the battery pack.

TRANSPORTATION

US DOT / TRANSPORT CANADA

UN No. 3480*

Proper Shipping Name	:	Lithium ion batteries
Class	:	9
Packing Group	:	II
Hazard Label	:	Miscellaneous

When transported in the US the battery is subject to the requirements of 49 CFR 173.185.

When transported in the Canada the battery is subject to Canada Transportation of Dangerous Goods requirements.

**Note: Transport Canada Technical Bulletin RDIMS #5872093 (December 2010) allows shipping of lithium ion batteries to use this shipping description UN3480.*

INTERNATIONAL (Air / Vessel)

UN No. 3480

Proper Shipping Name	:	Lithium ion batteries
Class	:	9
Packing Group	:	II
Hazard Label	:	Miscellaneous

ICAO/IATA

Packing Instruction	:	965
Maximum Gross Weight per Package on Passenger and Cargo Aircraft	:	5 kg
Maximum Gross Weight per Package on Cargo Only Aircraft	:	35 kg
Special Provision	:	A88, A99, A154, A164, A181, A182, A183, A184, A185

IMO-IMDG

Packing Instruction	:	P903
Special Provision	:	188, 230, 310, 957
EmS	:	F-A, S-I

INTERNATIONAL ROAD (**Larger European/Mediterranean area only**)

ADR

Packing Instruction	:	P903, P908, LP904
Special Provision	:	188, 230, 310, 348, 661
Tunnel Code E	:	E
Class	:	9
Packing Group	:	II

DISPOSAL

Recover or recycle battery at end of use or end of life. The battery contains recyclable material and recycling is encouraged over disposal. Regional, national, state/provincial and local laws must be followed in the handling, storing, transportation and final disposition of the battery and battery components. Disposal should be in accordance with applicable regional, national, state/provincial and local laws and regulations. Local regulations may be more stringent than regional or national requirements. Damaged battery or cell should be stored in ventilated area away from flammable material, heat or open flames. Dispose or recycle in a sealed, non-conductive plastic bag, drum or container.