



Material/Product Safety Data Sheet (MSDS-PSDS)

MP/VL products	Rechargeable lithium-ion single cells and multi-cell battery packs	Simplified Advice Code
Revision 4 Date 08/2007		G

1. Identification of the Substance or Preparation and Company		
Product	Rechargeable lithium-ion cylindrical and medium prismatic single cells and multi-cell battery packs	
Production sites	Saft America Inc. 313 Crescent Street Valdese North Carolina 28690 USA Tel. No. +1 (828) 874 4111 Fax No. +1 (828) 874 2431	Saft Rue Georges Leclanché BP 1039 86060 Poitiers cedex 9 FRANCE +33 (0)5 49 55 48 48 +33 (0)5 49 55 48 50
Emergency contacts Within the USA	+1 (703) 527 3887 +1 (800) 424 9300	(CHEMTREC US Service Center)

2. Composition & Information on Ingredients					
Each cell consists of an hermetically sealed metallic container containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release.					
Ingredient	Content (Wt. %)	CAS No.	CHIP Classification		
Lithium metal	0 <i>(in spite of their name, these batteries do not contain any lithium metal)</i>				
LiCoO ₂ (Lithium cobalt oxide)	≈ 34%	12190-79-3			R22, R43 S24, S37
Organic solvents	≈ 11 % EA (Ethyl Acetate) EC (Ethyl Carbonate) DMC (DiMethyl Carbonate) <i>(Boiling Points: EA: +77°C; EC: +243°C DMC: +90°C)</i>	141-78-6 96-49-1 616-38-6			R11, R21, R34, R43 S16, S24, S26, S36, S37/39, S45, S61
LiPF ₆ (Lithium hexafluoro phosphate)	≈ 2.5 %	21324-40-3	 		R14, R21, R22, R41, R43 S8, S22, S24, S26, S36, S37, S45
Carbon (C _n)	≈ 18%	1333-86-4			NONE KNOWN
<i>Amount varies depending on cell size</i>					



3. Hazards Identification

Do not short circuit, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion. 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.

Under normal conditions of use, the electrode materials and liquid electrolyte they contain are not exposed to the outside, provided the battery integrity is maintained and seals remain intact. Risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery container. Electrolyte leakage, electrode materials reaction with moisture/water or battery vent/explosion/fire may follow, depending upon the circumstances.

4. First Aid Measures

Inhalation	Remove from exposure, rest and keep warm. In severe cases obtain medical attention.
Skin contact	Wash off skin thoroughly with water. Remove contaminated clothing and wash before reuse. In severe cases obtain medical attention.
Eye contact	Irrigate thoroughly with water for at least 15 minutes. Obtain medical attention.
Ingestion	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 vapours should be seen by a Doctor.

5. Fire Fighting Measures

CO₂ extinguishers, halon or copious quantities of water or water-based foam can be used to cool down burning Li- ion cells and batteries.

Do not use for this purpose sand, dry powder or soda ash, graphite powder or fire blankets.

Extinguishing media	Use water or CO ₂ on burning Li-ion cells or batteries
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6. Accidental Release Measures

Remove personnel from area until fumes dissipate. If the skin has come into contact with the electrolyte, it should be washed thoroughly with water.

Sand or earth should be used to absorb any exuded material. Seal leaking battery and contaminated absorbent material in plastic bag and dispose of as Special Waste in accordance with local regulations.



7. Handling and Storage	
Handling	Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. 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.
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 70°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.

8. Exposure Controls & Personal Protection	
Occupational exposure standard	Compound: LiCoO ₂ 0.1 mg/m ³ max. (OSHA) EC, EA, DMC N/A LiPF ₆ N/A
	Respiratory protection In all fire situations, use self-contained breathing apparatus.
	Hand protection In the event of leakage wear gloves.
	Eye protection Safety glasses are recommended during handling.
	Other In the event of leakage, wear chemical apron.



9. Physical and Chemical Properties	
Appearance	Cylindrical or prismatic shape
Odour	
pH	Not Applicable
Flash point	Not applicable unless individual components exposed
Flammability	Not applicable unless individual components exposed
Relative density	Not applicable unless individual components exposed
Solubility (water)	Not applicable unless individual components exposed
Solubility (other)	Not applicable unless individual components exposed

10. Stability and Reactivity	
Product is stable under conditions described in Section 7.	
Conditions to avoid.	Heat above 70°C or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble Short circuit. Expose over a long period to humid conditions.
Materials to avoid	
Hazardous decomposition Products	CO, CO ₂

11. Toxicological Information	
Signs & symptoms	None, unless battery ruptures. In the event of exposure 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	
Mammalian effects	None known if used/disposed of correctly.
Eco-toxicity	None known if used/disposed of correctly.
Bioaccumulation potential	None known if used/disposed of correctly.
Environmental fate	None known if used/disposed of correctly.

13. Disposal Considerations	
Do not incinerate, or subject cells to temperatures in excess of 70°C. Such abuse can result in loss of seal, leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.	



14. Transport Information	
Label for conveyance	For the single cell batteries and multicell battery packs that are non-restricted to transport, use lithium-ion batteries inside label. For the single cell batteries and multicell battery packs which are restricted to transport (assigned to the Miscellaneous Class 9), use Class 9 Miscellaneous Dangerous Goods and UN Identification Number labels. In all cases, refer to the product transport certificate issued by the Manufacturer.
UN number	UN 3090
Shipping name	Lithium Batteries
Hazard classification	Depending on their equivalent lithium metal content, some single cells and small multicell battery packs may be non- assigned to Class 9 (Refer to Transport Certificate)
Packing group	II
IMDG Code	9033
CAS	
EmS No.	4.1-06
Marine pollutant	No
ADR Class	Class 9

15. Regulatory Information			
Risk phrases	LiCoO ₂	R22 R43	Harmful if swallowed. May cause sensitization by skin contact.
	EA/EC/DMC Organic solvents mix	R11 R21 R34 R43	Highly flammable Risk of damage to the skin Cause burns May cause sensitization by skin contact.
	LiPF ₆	R14 R21 R22 R41 R43	Reacts with water Harmful in contact with skin Harmful if swallowed. Risk of serious damage to eye May cause sensitization by skin contact.
Safety phrases	LiCoO ₂	S24 S36 S37	Avoid contact with skin. Wear suitable protective clothing. Wear suitable gloves
	EA/EC/DMC organic solvents mix	S16 S24 S26 S36 S37 S45 S61	Keep away from sources of ignition Avoid contact with skin. In case of contact with eyes, rinse immediately with plenty of water. Wear suitable protective clothing. Wear suitable gloves. In case of incident, seek medical attention. Avoid release to the environment
	LiPF ₆	S8 S22 S24 S26 S36 S37 S45	Keep away from moisture Do not breathe dust Avoid contact with skin In case of contact with eyes, rinse immediately with plenty of water. Wear suitable protective clothing. Wear suitable gloves. In case of incident, seek medical attention.
UK regulatory references	Classified under CHIP		

16. Other information



This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

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Edition 4 August 2007



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Signature

A handwritten signature in blue ink, appearing to read 'Alain Kerouanton', written over a horizontal line.

Alain Kerouanton
Lithium Product Manager