MATERIAL SAFETY DATA SHEET

Chemical Product and Company Identification

LABEL IDENTIFIER: Battery, Lithium, Optimair 6A

PRODUCT IDENTIFIER: P/N 816911 Battery, Lithium
P/N 816912 Battery Pack, Lithium

COMPANY IDENTIFICATION: MINE SAFETY APPLIANCES COMPANY
1100 Cranberry Woods Drive
Cranberry Township, PA 16066
CUSTOMER SERVICE: 1-800-MSA-2222 (8:30 a.m. – 5:00 p.m., USA local time)
EMERGENCY: 1-800-255-3924 (CHEM-TEL, INC.)

Vendor Information

A Material Safety Data Sheet as furnished by Saft America, Inc. for Lithium/Sulfur Dioxide Cells and Batteries is attached. (6 Pages)

Saft America, Inc. MSDS REVISION DATE: February 2009

Other Information

WARNING: This is a hazardous chemical product. By following the directions and warnings provided with this product, the hazards associated with the use of this product can be greatly reduced but never entirely eliminated. Mine Safety Appliances Company makes no warranties, expressed or implied, with respect to this product and EXPRESSLY DISCLAIMS THE WARRANTY OF MERCHANTABILITY AND ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Users assume all risks in handling, using, or storing this product.

Material/Product Safety Data Sheet
(MSDS-PSDS)

LO/G products	Lithium /Sulfur (Sulphur) dioxide single cells and multi-cell battery packs
Revision 6 Date 02/2009	

1. Identification of the Substance or Preparation and Company			
Product	**Lithium/Sulfur (Sulphur) dioxide unit cells and multi-cell battery packs ($Li-SO_2$)**		
Production sites	Saft Ltd. River Drive Tyne & Wear South Shields NE33 2TR – UK Ph. :+44 191 456 1451 Fax :+44 191 456 6383	Saft Rue Georges Leclanché BP 1039 86060 Poitiers cedex 9 FRANCE Ph. :+33 (0)5 49 55 48 48 Fax :+33 (0)5 49 55 48 50	Saft America Inc 313 Crescent Street Valdese NC 28690 – USA Ph. :+1 (828) 874 4111 Fax :+1 (828) 874 2431
www.saftbatteries.com (section "Contact")			
Emergency contact	+1 (703) 527 3887 (CHEMTREC US Service Center) within the USA : 800 424 9300		

2. Hazards Identification

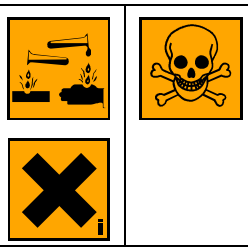
Do not short circuit, recharge, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion. The Lithium-Sulfur dioxide batteries described in this Product Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, the electrode materials and 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 containers. Electrolyte leakage, electrode materials reaction with moisture.

3. Composition & Information on Ingredients

Each cell consists of a 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	CAS No.	CHIP Classification		
Lithium *(Li)*	< 3.0%	7439-93-2			**F**; R14/15 **C**; R34 R14/15, R21,R22, R35, R41, R43 S2, S8, S45
Acetonitrile *(CH_3CN)*	< 9%	75-05-8			**F;** R11, R14/15, R21, R22, S2, S8, S24, S26, S36, S37, S45

Sulfur dioxide *(SO_2)*	< 30%	7446-09-5		R22, R36/37, R41, S2, S8, S22, S24, S26, S36, S37, S45
Lithium Bromide *(LiBr)*	2.0 – 2.5%	7550-35-8		NONE KNOWN
Carbon *(C_n)*	6.5 – 7.0%	1333-86-4		NONE KNOWN
Amount vary depending on cell size				

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

CO_2 extinguishers or, even preferably, copious quantities of water or water-based foam can be used to cool down burning Li-SO_2 cells and batteries, as long as the extent of the fire has not progressed to the point that the lithium metal they contain is exposed (marked by deep red flames).
Do not use for this purpose sand, dry powder or soda ash , graphite powder or fire blankets.
Use only metal (Class D) extinguishers on raw lithium.

Extinguishing Media	Use water or CO_2 on burning Li-SO_2 cells or batteries and class D fire extinguishing agent only on raw lithium

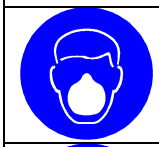
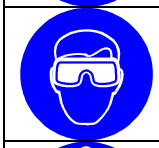
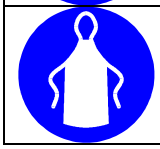
6. Accidental Release Measures

Remove personnel from area until fumes dissipate. Do not breathe vapours or touch liquid with bare hands.

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 90°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	Lithium-Sulfur dioxide batteries are not rechargeable and should not be tentatively charged. 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	8hr TWA	15min TWA	SK
		Sulfur (Sulphur) dioxyde	1 ppm	1 ppm	-
	**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	If leaking, gives off a pungent corrosive 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. Recharge. Short circuit. Expose over a long period to humid conditions.
Materials to avoid	Oxidising agents, alkalis, water.
Hazardous decomposition Products	Hydrogen (H_2) as well as Lithium oxide (Li_2O) and Lithium hydroxide (LiOH) dust is produced in case of reaction of *lithium metal* with water.

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 tact 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 temperature's 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 Note : when manufacturing a new battery pack, one must assure that it is tested in accordance with the UN Model Regulations, Manual of Tests and Criteria, Part III, subsection 38.3	
Label for conveyance	For the single cell batteries and multicell battery packs which are non-restricted to transport, use lithium 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 (cells and batteries transported in bulk) UN 3091 (cells and batteries transported in or with equipment)
Shipping name	Lithium Metal Batteries
Hazard classification	Depending on their 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	3090 (Lithium batteries) 3091 (Lithium batteries in or with equipment)
CAS	
EmS No.	F-A, S-I
Marine pollutant	No
ADR class	Class 9

15. Regulatory Information

Regulations specifically applicable to the product:

- ACGIH and OSHA: see exposure limits of the internal ingredients of the battery in section 8.
- IATA/ICAO (air transportation): UN 3090 or UN 3091
- IMDG (sea transportation) : UN 3090 or UN 3091
- Transportation within the US-DOT, 49 Code of Federal Regulations

Risk phrases	Lithium *(Li)*	R14/15 R21 R22 R35 R41 R42/43	Reacts violently with water, liberating extremely flammable gases. Harmful in contact with skin. Harmful if swallowed. Causes burns. Risk of serious damage to eye. May cause sensitization by inhalation and skin contact.
	Acetonitrile *(CH_3CN)*	R11 R14/15 R21 R22	Highly flammable. Reacts violently with water, liberating extremely flammable gases. Harmful in contact with skin. Harmful if swallowed.
	Sulfur dioxide *(SO_2)*	R22 R36/37 R41	Harmful if swallowed. Irritating to respiratory system. Risk of serious damage to eye.

Safety phrases	Lithium *(Li)*	S2 S8 S45	Keep out of reach of children Keep away from moisture In case of incident, seek medical attention.
	Acetonitrile *(CH_3CN)*	S2 S8 S24 S26 S36 S37 S45	Keep out of reach of children. Keep away from moisture. 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.
	Sulfur dioxide *(SO_2)*	S2 S8 S22 S24 S26 S36 S37 S45	Keep out of reach of children. 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 6 – February 2009

Signature _____

Nicolas Paquin
Lithium Product Manager