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Battery information sheet

Primary Li-MnO2 cells and battery packs

According to the REACH Regulation (EC 1907/2006, Article 31) and the OSHA Directive (29 CFR 1910.1200), batteries are products not intended to release substances. Therefore, there is no legal obligation to prepare and release a safety data sheet for batteries.

This battery information sheet is provided to our customers for informational purposes only.

1. PRODUCT AND COMPANY IDENTIFICATION

Unless otherwise stated, all data applies to both cells and battery sets.

1.1 Product

Lithium manganese dioxide primary cells and battery packs consisting of these cells

1.2 Supplier

headquarters Address Phone/Fax:	Saft S.A.S. 12, rue Sadi Carnot, 93170 Bagnolet, France Telephone/ Fax: +33 (0)1 49 93 19 18 / +33 (0)1 49 93 19 50 Friemann &
Work Address Phone/Fax:	Wolf Batterietechnik GmbH (FRIWO) Industriestrasse 22, 63654 Büdingen, Germany +49 (0)6042 954 150 / +49 (0)6042 954 490 Juice Poitiers
Work Address Phone/Fax:	 Rue Georges Leclanché BP n°1039, 86060 POITIERS Cedex 9 France +33 (0)5 49 55 48 48 / +33 (0)5 49 55 48 50 Saft Ltd.
Work Address Phone/Fax:	 River Drive, Tyne & Wear, SOUTH SHIELDS, NE33 2TR Großbritannien +44 191 456 1451 / +44 191 456 6383
Work Address Phone/Fax:	Waldensian Saft 313 Crescent Street, VALDESE, NC 28690 USA +1 828 874 4111 / +1 828 874 2431

1.3 Contact options in case of emergency:

Chemtrec US Service Customer Service within the USA: +800 424 93 00 / international: +1 202 483 7616 (English)
INRS Orfila: +33(0) 1 45 42 59 59 (French)
For FRIWO cells: +49(0) 6042 954 599 (German and English)

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2. POSSIBLE HAZARDS

No chemical hazard exists under normal use in accordance with Saft's recommendations (see user manuals or similar documentation). Under normal conditions of use, the electrode materials and the electrolyte contained therein will not be released, provided the battery integrity is maintained and the seals are intact. Contact with the battery contents or their combustion products can be harmful.

A risk of release exists only in the event of improper handling (mechanical, thermal, electrical), which could activate the safety valves and/or cause the battery containers to burst. In particular, the battery must not be opened, incinerated, or stored or used outside the specified temperature range (see section 4 for further details). Depending on the circumstances, electrolyte leakage, battery degassing, battery explosion, or battery fire may otherwise occur.

Charging protection:

Whenever lithium batteries are not the sole power source in a circuit, the following measures recommended by Underwriters Laboratories must be observed. The cells must not be connected in series with any electrical power source that would increase the load on individual cells. The electronic circuit must include one of the following component types:

A. Two suitable diodes (or equivalents) connected in series with the cells to prevent reverse current (charging current). The second diode assumes this protective function if the first diode fails. The device manufacturer must establish appropriate quality control procedures or comparable methods to verify the correct diode polarity for each unit.

Or B.

A blocking diode (or equivalent) to prevent reverse current (charging current) and an electrical resistor to limit the current in case of diode failure. The resistor should be sized to limit the reverse current (charging current) to the maximum value specified in the cell datasheet.

Hazards from released material in the event of opened cells:

EYE CONTACT: May cause eye irritation. Dust can trigger inflammation of the eyelids.

SKIN CONTACT: May cause skin irritation.

INHALATION: May cause irritation of the respiratory tract and mucous membranes. If gas escapes during battery removal, throat irritation may occur.

SWALLOWING: Can cause poisoning if swallowed.

3. COMPOSITION, INFORMATION AND INGREDIENTS

3.1 For cells

Components	CAS Number	EINECS/ELINCS Salary (Weight %)*	
Lithium	7439-93-2	231-102-5	3-4
Manganese dioxide	1313-13-9	215-202-6	40-50
Organic electrolyte**	n. z.	n. z.	15-25
carbon	1338-86-4		1-5
copper	7440-50-8	231-159-6	1-15

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Aluminium	7429-90-5	231-072-3	1-20
Stainless steel, nickel and inert materials	n. z.	n. z.	Rest

* The quantities vary depending on the cell type.
** Contains 1,2-dimethoxyethane (CAS 110-71-4, EINECS 603-031-00-3), content < 3%, on the REACH candidate list since June 2012.

3.2 For battery sets

The concentration may vary depending on the battery pack; however, the specified concentration ranges will not be exceeded.

4. HANDLING AND STORAGE

IMPORTANT NOTICE: Without permission from Saft, the battery must not be opened, destroyed or burned, as this could cause a fire or the cell contents could be harmful if released under certain circumstances.

The lithium manganese dioxide cells and batteries described in this battery information sheet are hermetically sealed units that pose no danger if used in accordance with the manufacturer's recommendations.

STORAGE:

- The cells and batteries must be stored in a cool and dry place. Condensation must be prevented.
- High temperatures can reduce battery life and impair performance.
- Batteries should not be stored in high humidity environments for extended periods of time.
- Since short circuits can cause leaks and pose a risk of fire or explosion, the batteries should be stored in their original packaging and separately from each other until they are used.
- The original packaging must be kept for the return of cells or battery sets to the supplier.

HANDLING:

- Recharging is not permitted.
- Deep discharge or forced discharge must not occur.
- The positive (+) or negative pole (–) must not be short-circuited with conductors.
- The polarity must not be reversed.
- The battery packs or cells must not be opened.
- They must not be subjected to any mechanical overload (puncture, crushing, deformation, etc.).
- They must not be exposed to water or condensation, nor to oxidizing or reducing agents, acids or bases.
- They must not be exposed to temperatures exceeding the battery temperature rating.
- They must not be heated directly, soldered, or thrown into a fire.
- The batteries must be disconnected immediately if they emit an unusual odor during operation, become hot, change shape, or appear otherwise abnormal. They should then be placed immediately in a bucket of water. Contact Saft if any of these problems occur.

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BATTERY KIT ASSEMBLY:

The design and assembly of battery packs requires appropriate qualifications, expertise and experience.
It is therefore not recommended that end users attempt to construct and/or assemble battery packs themselves. All batteries with lithium cells should preferably be manufactured by Saft to ensure proper construction and assembly. A comprehensive battery assembly service is available from Saft.
Further information can be obtained from Saft. However, if this is not possible for any reason, Saft may confidentially review the battery pack design to ensure that the design (assembled and in use) is safe and meets the specified performance requirements.

MISCELLANEOUS:

The manufacturer's recommendations regarding maximum current and operating temperature range values must be observed.

5. PHYSICAL AND CHEMICAL PROPERTIES

In their ready-to-sell state, the lithium-MnO2 cells described in this battery information sheet are -
Hermetically sealed batteries that prevent the user from being exposed to hazardous chemicals, provided they are used in accordance with the manufacturer's instructions.

Einheiten. Es handelt sich um gebrauchsfertige „Produkte“,

6. STABILITY AND REACTIVITY

The product is stable under the conditions described in section 4.
The following dangers can occur if a cell is opened through improper handling:

DANGEROUS REACTIONS: Lithium released from the cell can react with water in the atmosphere, producing hydrogen (a highly flammable gas).

HAZARDOUS DECOMMISSION PRODUCTS: Thermal decomposition of the cell can lead to the release of electrolyte fluid and vapor, as well as pollutants and dust.

Substances to avoid: Oxidizing agents, bases and water.

CONDITIONS TO AVOID: The cell must not be heated or incinerated beyond the temperature specified in the accompanying data sheet. It must not be disassembled, crushed, punctured, short-circuited, charged, or recharged. Mechanical or electrical overload must be avoided.

7. TOXICOLOGICAL INFORMATION

Irritation is only a risk if the cell is subjected to such mechanical, thermal, or electrical stress that its casing integrity is compromised. In this case, irritation of the skin, eyes, and respiratory tract can occur.

1,2-Dimethoxyethane (EGDME) can impair fertility and harm unborn children. EGDME has been listed as a Substance of Very High Concern (SVHC) on the REACH Candidate List since June 2012.

8. INFORMATION ON ECOLOGY

No adverse effects are known when used and disposed of correctly.

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9. DISPOSAL INFORMATION

Recycling batteries is either required by law (European Directive 2006/66/EC) or recommended.

Since even cells and batteries that have been discharged to their discharge cut-off voltage can still contain considerable amounts of energy, the terminals must always be protected to prevent short circuits.
Disposal must be carried out in accordance with all applicable laws and regulations (please contact your local dealer for details). The material to be disposed of must be stored as described in section 4.
DO NOT dispose of cells and/or battery packs in a sewer or other body of water, and do not simply throw them on the ground.

A disposal service is offered for large quantities upon request.

See:

http://www.saftbatteries.com/TheSaftGroup/Environment/Takebackpolicy/tabid/104/Language/en-US/Default.aspx
http://www.saftbatteries.com/TheSaftGroup/Environment/BringBackPoints/tabid/435/Language/en-US/Default.aspx

10. TRANSPORT INFORMATION

Note: When manufacturing a new battery pack, care must be taken to ensure that it passes the tests in accordance with the UN Model Regulations in the Manual of Tests and Criteria, Part III, Subsection 38.3.

10.1 UN Transport Regulations

Lithium MnO2 cells and battery packs are listed as dangerous goods according to the UN Recommendations for the Transport of Dangerous Goods. Depending on their lithium metal content, the transport of some individual cells and small battery packs may not be subject to transport restrictions (see the respective transport document).

UN Number	**UN 3090 (cells and batteries transported in bulk)**
	UN 3091 (cells and batteries transported with or in equipment)
ADR class	**Class 9**
Packaging group:	**II**
Shipping name:	**Lithium metal batteries**

10.2 Shipping label

For individual cells and battery packs that are not subject to transport restrictions, a label with the designation is required.
„Enthält Lithiumbatterien“ zu verwenden.
For individual cells and battery packs that are subject to transport restrictions (assigned to class 9), a label is required.
„Klasse 9 – Verschiedene gefährliche Stoffe und Gegenstände“ **as well as a label with the corresponding UN identification number to use.**
In all cases, the product transport document issued by the manufacturer must be observed.

10.3 International Agreements

International air traffic: IATA A88, A99, A154, A164, P968, P969, P970
International Maritime Transport: IMDG 188, 230, 310, P903

EmS No.	**F-A, S-I**
Marine pollutants	**No**
Storage and separation:	**Category A**

European road transport: ADR 188, 230, 310, 636, P903, P903a, P903b
European rail transport: RID 188, 230, 310, 636, P903, P903a, P903b

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In all cases, the product transport document issued by the manufacturer must be observed.

11. INFORMATION ON REGULATIONS

Notes on labelling European
Union: According to Directive 2006/66/EC, batteries must be marked with the symbol of a crossed-out wheeled bin.

12. FIRST AID MEASURES (not required under normal use)

12.1. Electrolyte contact

EYE CONTACT: Rinse eyes thoroughly with plenty of water for at least 15 minutes. Consult a doctor.

SKIN CONTACT: Wash skin thoroughly with tap water. Remove contaminated clothing and wash it before reuse. Consult a doctor in severe cases.

INHALATION: Remove affected individuals from the danger zone, place them in a calm position, and keep them warm. In severe cases, seek medical attention.

IF SWALLOWED: Rinse mouth thoroughly with water and then give plenty of water to drink. Consult a doctor.

FURTHER TREATMENT: In all cases of eye contamination, persistent skin irritation, and in cases where affected individuals have swallowed this substance or inhaled its vapors, a doctor should be consulted.

12.2. Lithium metal contact

EYE CONTACT: Immediately open the eyes and rinse thoroughly with plenty of water for at least 15 minutes. Seek medical attention immediately.

SKIN CONTACT: Remove the lithium particles from the skin as quickly as possible. Immediately wash the skin with plenty of water for at least 15 minutes. Consult a doctor without delay.

INHALATION/SWALLOWING: The contents of an open cell can cause irritation of the airways and mucous membranes. Remove affected individuals from the danger zone, keep them calm and warm. Immediately administer a corticosteroid inhaler. In severe cases, patients should be monitored by a doctor for 48 hours.

13. FIRE FIGHTING MEASURES (not required under normal use)

EXTINGUISHER:

- Li-MnO2 cells and battery sets: CO2 extinguishers or preferably plenty of water or water-based extinguishing foam can be used to cool burning Li-MnO2 cells and batteries, provided that the lithium metal contained in them has not yet been released by the fire (lithium metal burns deep red).

- Raw lithium: Only metal fire extinguishing agents (class D) may be used.
- Sand, extinguishing powder or sodium carbonate, graphite powder or fire blankets must not be used.

SPECIAL FIRE FIGHTING MEASURES: Firefighters must wear self-contained breathing apparatus.

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To avoid inhaling toxic fumes, approved/certified vapor respirators must be used. To prevent possible skin contact with the electrolyte solution, appropriate protective clothing and...
Equipment to be worn. Any class of extinguishing agents listed above can be used for these batteries or their packaging material. To prevent the batteries from bursting, their exterior must be cooled in the event of a fire.

SPECIAL HAZARDS FROM CONTACT WITH THE SUBSTANCE/PREPARATION AND COMBUSTION AND GAS PRODUCTS: Evaporated or decomposed electrolyte may leak from the cell if it is heated to temperatures above its permissible temperature range. Solvents contained in the electrolyte are flammable liquids and must be kept away from any ignition source.

At temperatures above 160 °C, the cells/battery sets can explode, releasing sparks, metal parts, and burning lithium.

14. EXPOSURE LIMITATION AND PERSONAL PROTECTIVE EQUIPMENT* (not required under normal use)

An open battery or cell should only be handled in a well-ventilated place.

	Respiratory protection	If a cell is open or leaking after an incident or overuse, respiratory protective devices with ABEK filters that cover the entire face or escape masks (self-contained breathing apparatus) must be used. Firefighters must wear self-contained breathing apparatus.
	Hand protection	When handling leaking or ruptured cells, polypropylene, polyethylene, rubber or Viton gloves should be used.
	Eye protection	When handling leaking or ruptured cells, protective goggles with side shields or masks covering the entire face must be worn if a cell is open or leaking after an incident or overuse.
	Miscellaneous	In case of leaking or ruptured cells, a rubber apron and protective clothing must be worn.

* AFNOR pictograms

15. ACCIDENTAL RELEASE MEASURES (not required under normal use)

PERSONAL MEASURES: Employees must be evacuated from the contaminated area until the fumes have dissipated. If electrolyte leaks from a cell or battery, the gas should not be inhaled if possible. In case of skin or eye contact, inhalation, or ingestion, the measures described in section 12 must be taken.

ENVIRONMENTAL PROTECTION MEASURES: No wastewater, surface water, or groundwater contamination is permitted. No soil or air pollution is permitted.

CLEANUP/DISPOSAL: Wearing safety goggles and gloves, any spilled substances should be contained with absorbent material (sand, soil, or vermiculite). A leaking battery (unless it is hot) and the contaminated absorbent material should be sealed in a plastic bag and disposed of as hazardous waste in accordance with applicable regulations.

16. OTHER INFORMATION

Lithium-MnO2 cells from Friemann & Wolf are registered with Underwriters Laboratories (Northbrook, USA) under number

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MH 46385/Project No. 08CA08489 registered.

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