



Safety Data Sheet (SDS)

for
Cole-Parmer Lithium-Iron-Disulfide (Li-metal) Batteries
single cells and multi-cell battery packs

No.1

1/7

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The information contained within is provided as a service to our customers and for their information only. The information and recommendations set forth herein are made in good faith and are believed to be accurate at the date of preparation. Cole-Parmer Instrument Company makes no warranty expressed or implied.

Section 1: Identification

Product Identifier

Product name: "ANSMANN EXTREME Lithium"
Designation: Lithium Metal Battery
Models / types: AA / FR6 / L91; AAA / FR03 / L92
Electrochemical system: Li-FeS₂ (Lithium-Iron-Disulfide)
Other identifying product numbers: 9761032, 9761034 (Cole-Parmer product numbers)

Supplier Details

Company: Cole-Parmer Instrument Company
Address: 625 East Bunker Court
Vernon Hills, IL 60061 USA
Phone / Fax: 800-323-4340

Emergency Telephone Number (24 hours)

For chemical emergency (spill, leak, fire, exposure or accident) call phone number:
+49 6294 4204 0

Legal remark (USA)

Safety Data Sheets are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article". According to OSHA, "article" means a manufactured item other than a fluid particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

Because all of our batteries are defined as "articles", they are exempted from the requirements of the Hazard Communication Standard.

Legal remark (EU)

These batteries are not "substances" or "mixtures" according to Regulation (EC) No 1907/2006/EC. Instead they have to be regarded as "articles", no substances are intended to be released during handling. Therefore there is no obligation to supply a "safety data sheet according to Regulation (EC) 1907/2006, Article 31"

General remark

This safety data sheet is provided as a service to our customers. The details presented are in accordance with our present knowledge and experiences. They are not contractual assurances of product attributes.

Section 2: Hazard(s) Identification

GHS classification: N/A

Signal Word: N/A

Hazard statement(s): N/A

Under normal conditions of use, the battery is hermetically sealed. Thus, the ingredients have no hazard potential, except the battery is violated or dismantled.

If in case of mistreatment the ingredients are released, a spontaneously flammable gas mixture may be released under certain circumstances (measures according to chapter 4 to 6)

Attention: If batteries are treated wrong the danger of burns or bursts occurs. Batteries must not be heated above 100°C or incinerated. The battery contents must not get in contact with water. If the negative electrode gets in contact with water or humidity hydrogen gas is formed, which may inflame spontaneously.

Section 3: Composition and Informations 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.	Hazard Categories	Hazard Statements
Lithium-Aluminum Alloy (Li-Al)	4 - 6%	7439-93-2	Water-react. 1 Skin Corr. 1B	H260 H314
Iron Disulfide (FeS ₂)	25 - 40%	1309-36-0	Skin Corr./Irrit. 3 Serious Eye Damage/Irrit. 2 Specific target organ toxicity - respiratory system 3	H317 H320 H335
Propylene Carbonate	<5%	108-32-7	Eye Irrit. 2	H319
1,2-Dimethoxyethane (DME)	<5%	110-71-4	Flam.Liq. 2; Acute Tox. 4 Repr. 1B	H225; H332 H360-FD
1,3-Dioxolane (DOL)	<10%	646-06-0	Flam.Liq. 2	H225
Lithium Perchlorate (LiClO ₄)	<1%	7791-03-9	Ox. Sol. 2; Skin Irrit. 2 Eye Irrit. 2; STOT SE 3	H272; H315 H319; H335
Graphite	1 - 3%	7782-42-5	Skin Corr./Irrit. 3 Serious Eye Damage/Irrit. 2 Specific target organ toxicity - respiratory system 3	H316 H320 H335
stainless steel (Fe)	30 - 40%	7439-89-6	non-hazardous	
Aluminum (Al)	2 - 8%	7429-90-5	non-hazardous	
Acetylene Carbon black (C)	1 - 2%	1333-86-4	Eye Irrit. 2A STOT SE 3	H319 H335
Polypropylene	2 - 5%	9003-07-0	non-hazardous	
Adhesive CMC	0.1 - 2%	9085-26-1	non-hazardous	
Adhesive SBR	0.1 - 2%	9003-55-8	non-hazardous	

Remark: The weight of metallic lithium per AA (FR6) cell is ≤ 0.9g per AAA (FR03) cell is ≤ 0.45g

Section 4: First Aid Measures

Inhalation:	Provide fresh air. In severe cases obtain medical attention.
Skin Contact:	Wash off skin thoroughly with water. Remove contaminated clothing and wash before re-use. In severe cases obtain medical attention.
Eye Contact:	Irrigate thoroughly with water for at least 15 minutes. Lifting upper and lower lids, until no evidence of the chemical remains. Obtain medical attention.
Ingestion:	Wash out mouth thoroughly with water. Do not induce vomiting or give food or drink. Seek medical attention immediately.
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.

Section 5: Fire Fighting Measures

CO₂ extinguishers or, even preferably, copious quantities of water or water-based foam, can be used to cool down burning Li-FeS₂ 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 CO₂ on burning Li-FeS₂ cells or batteries and class D fire extinguishing agent only on raw lithium.

Section 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.

Section 7: Precautions for safe Handling and Use

Storage: Store in a cool (preferable below 30°C), well ventilated area, away from moisture, sources of heat, open flames, food and drink.
Elevated temperatures can result in shortened battery life. Temperatures above 100°C may result in battery leakage and rupture.
In locations that handle large quantities of lithium batteries, such as warehouses, lithium batteries should be isolated from unnecessary combustibles.
Keep batteries in original packaging until use and do not jumble them.

Mechanical Containment: If potting or sealing the battery in an airtight or watertight container is required, consult Ansmann AG representative for precautionary suggestions. 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 cause the safety vent release vent to open. Sources of short-circuits include jumbled batteries in bulk containers, metal jewelry, 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 Ansmann representative for proper precautions to prevent seal damage or short-circuit.

Charging: Do not charge this batteries! This battery type is manufactured in a ready-to-use-state. It is not designed for recharging.

Recharging can cause battery leakage, or in some cases, can cause the safety release vent to open. Inadvertent charging can occur if a battery is installed backwards.

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

Section 8: Special Protection Information

Ventilation Requirements: Not necessary under normal conditions. Room ventilation may be required in areas where there are open or leaking batteries.

Respiratory Protection: Not necessary under normal conditions. Avoid exposure to electrolyte fumes from open or leaking battery. In all fire situations, use self-contained breathing apparatus



Eye Protection: Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.



Hand Protection: Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery



Section 9: Physical and Chemical Properties

Appearance:	small round cylinders	Odour:	n/a
Vapour Density:	n/a	Vapour Pressure:	n/a
Boiling Point:	n/a	VOC Content:	n/a
Evaporation Rate:	n/a	Solubility in Water:	n/a
Specific Gravity:	not determined	pH:	not determined

Ingredients:

- FeS₂ is a brass-coloured, odourless mineral powder
melting point: FeS₂ decomposes at 1193°C
- Lithium is a soft, silvery metal
- Electrolyte is an organic solvent, consisting of PC, DME, DOL, lithium perchlorate
this organic solvent is an odourless, colourless or light yellow liquid

Section 10: Stability and Reactivity

Product is stable under conditions described in Section 7.

Conditions to avoid: Heat above 100° 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. Avoid electrolyte contact with aluminium or zinc.

Hazardous decomposition products: Hydrogen sulfide gas; Sulfur dioxide gas; Corrosive lithium hydroxide fumes

Section 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.

Section 12: Ecological Information

Mammalian effects: None known if used / disposed of correctly

Eco-toxicity: None known if used / disposed of correctly

Environmental fate: None known if used / disposed of correctly

Section 12: Disposal Information

Do not incinerate, recharge, disassemble short, or subject cells to temperatures in excess of 100°C. Such abuse can result in loss of seal, leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.

When properly used and disposed the battery does not present environmental hazard. The battery does not contain mercury, cadmium, or lead. Do not let internal components enter marine environment. Avoid release to waterways, wastewater or ground water.

USA: Batteries must be completely discharged prior to disposal and / or the terminals must be taped or capped to prevent short circuit. This product does not contain any materials listed by the United States EPA as requiring specific waste disposal requirements. When completely discharged it is not considered hazardous. Disposal of large quantities of lithium power cells may be subject to Federal, State, or Local regulations.

In the European Union, manufacturing, handling and disposal of batteries is regulated on the basis of the DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC. Customers find detailed information on disposal in their specific countries using the web site of the European Portable Batteries Association (http://www.epbaeurope.net/legislation_national.html)

Importers and users outside EU should consider the local laws and rules.

Section 14: Transport Information

Lithium metal batteries are classified as Class 9 Dangerous Goods in the United Nations Recommendation. In case of transport, compliance with all the relevant UN regulations is required.

Even though the batteries are classified as lithium metal batteries (UN3090, UN3091), they are not subject to some requirements of Dangerous Goods Regulations because they meet the following:

1. For cells the lithium content is not more than 1g, for batteries the lithium content is not more than 2g
2. Each cell / battery is type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3 (edition 5) - (DGR 39.2.6).
3. Each cell / battery is manufactured in ISO9001 certified factory

Provisions for the international transportation (pursuant to ICAO-TI / IATA-DGR / IMDG Code, ADR, RID, DOT)

ADR

UN-Number: 3090
description: Lithium metal batteries
class: 9

packaging order: P903
special provision: 188; 230; 310; 376; 377; 387; 636
tunnel forbidden code: E

UN-Number: 3091
description: Lithium metal batteries contained in equipment / packed with equipment
class: 9

packaging order: P903
special provision: 188; 230; 310; 360; 376; 377; 387; 670
tunnel forbidden code: E

IATA

UN-Number: 3090
description: Lithium metal batteries
class: 9

packaging order: 968 Section II if Li content is: < 0.3g / cell or < 0.3g / battery
Section I B if Li content is: > 0.3g < 1g / cell or > 0.3g < 2g / battery

special provision: A88; A99; A154; A164; A183; A201; A206; A213; A334; A802

UN-Number: 3091
description: Lithium metal batteries contained in equipment
class: 9

packaging order: 970 Section II if Li content is: < 1g / cell or < 2g / battery

special provision: A48; A88; A99; A154; A164; A181; A185; A206; A213

UN-Number: 3091
description: Lithium metal batteries packed with equipment
class: 9

packaging order: 969 Section II if Li content is: < 1g / cell or < 2g / battery

special provision: A88; A99; A154; A164; A181; A185; A206; A213

IMDG-Code 2015

UN-Number: 3090
description: Lithium metal batteries
class: 9

packaging order: P903
special provision: 188; 230; 310; 376; 377; 384; 387

UN-Number: 3091
description: Lithium metal batteries contained in equipment / packed with equipment
class: 9
packaging order: P903
special provision: 188; 230; 310; 360; 376; 377; 384; 387

USA (DOT 49 CFR)

special provision: 49 CFR Section 173.185

Other:

All Ansmann CR Lithium Metall cells and batteries fulfil the conditions pursuant to the requirements for partly regulated transportation of the relevant rules and regulations according to the above mentioned technical guidelines.

Packing, marking, labelling and weight limitations must be observed as per technical guidelines of the respective transport mode

Note:

Lithium metal cells and batteries are forbidden for transportation aboard passenger-carrying aircraft

General Handling Instructions

Battery cartons should be handled with care. Rough handling may result in batteries being short circuited or damaged. This may cause leakage, explosion or fire. (Refer also to section 7)

General Remark

The exemptions from dangerous goods regulations are only applicable with the respect to the delivery form / packaging in which the lithium batteries are dispatched by ANSMANN. Any re-packing or assembly of the cells and batteries is in the responsibility of the customer.

Section 15: Regulatory Information

Regulations specifically applicable to the product:

- ACGIH and OSHA: see exposure limits of the internal
- IATA / ICAO (air transportation): UN 3090 or UN 3091
- Transportation within the US-DOT, 49 Code of Federal Regulations
- REACH regulation (1907/2006/EC)
- Battery Directive 2006/66/EC

Duty to communicate information on substances in articles (REACH, Article 33):

The product contains the following substance of very high concern (SVHC) in concentrations above 0.1% w/w: DME (CAS 110-71-4): reason for inclusion in the European candidate list - Toxic for reproduction (REACH, Article 57c).

We hereby declare that this kind of lithium cells are in line with the chemical composition requirements of the RoHS Directive 2011/65/EU and the amendment in (EU)2015/863.

A formal compliance with the RoHS Directives cannot be stated as the applicable regulation for batteries is not the RoHS, but the Battery Directive 2006/66/EC. Requirements from the WEEE Directive 2002/96/EC are also covered by the Battery Directive. Accordingly there is no CE marking on batteries.

Since 1st of January 2013 it is necessary to produce both, lithium cells and lithium batteries under an existing quality assurance program.

The quality assurance program is detailed in following parts of the international dangerous goods laws:

- ADR (2019): 2.2.9.1.7 (e)
- IATA (2019, 60th edition): 3.9.2.6 (e)
- IMDG-Code (Amendment 39-18): 2.9.4 (5.)

Ansmann hereby declare that all lithium cells and batteries of the Ansmann product range are produced according the above named quality assurance program.

Section 16: Other Information

Full text of Hazard Statements referred to under section 3

H225	Highly flammable liquid and vapour.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H272	May intensify fire; oxidizer.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H316	Causes mild skin irritation
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H320	Causes eye irritation
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H360FD	May damage fertility. May damage the unborn child.

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