

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)



Printing date: January 18, 2018

Revision: January 18, 2018

1 Identification

- **Product identifier**
- **Trade name:** Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte
- **Article number:** No other identifiers
- **Recommended use and restriction on use**
- **Recommended use:** Lithium-based battery product.
- **Restrictions on use:** Contact manufacturer/supplier
- **Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
Engineered Power
20, 3103 - 14th Avenue N.E. Calgary, Alberta, Canada T2A 7N6
Telephone
(403) 235-2584
- **Emergency telephone number:**
ChemTel Inc.
(800)255-3924 (North America)
+1 (813)248-0585 (International)

2 Hazard(s) identification

- **Classification of the substance or mixture**
Skin Corr. 1B H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.
STOT SE 3 H335 May cause respiratory irritation.
- **Additional information:**
Note: Leaking cells pose health hazards: see Sections 4 and 11. Intentional abuse of cells or batteries increases the risk of harm or damage to the product, to the user, and to surrounding materials and personnel. Do not attempt to open sealed cells or batteries. Do not intentionally short-circuit cells or batteries. Do not expose these products to temperatures exceeding the maximum manufacturers rating. Do not dispose of cells/batteries in landfills. Please follow all manufacturer guidelines in the use, storage, and disposal of these products. Consult manufacturer in cases of questions involving specific product usage.
There are no other hazards not otherwise classified that have been identified.
- **Label elements**
- **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms:**
 
GHS05 GHS07
- **Signal word:** Danger
- **Hazard statements:**
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
- **Precautionary statements:**

(Cont'd. on page 2)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

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Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 1)

- P260 Do not breathe dusts or mists.
 P264 Wash thoroughly after handling.
 P271 Use only outdoors or in a well-ventilated area.
 P280 Wear protective gloves/protective clothing/eye protection/face protection.
 P301+P330+P331 If swallowed: Rinse mouth. Do NOT induce vomiting.
 P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P310 Immediately call a poison center/doctor.
 P321 Specific treatment (see on this label).
 P363 Wash contaminated clothing before reuse.
 P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· NFPA ratings (scale 0 - 4)


Health = 3
 Fire = 1
 Reactivity = 0

The substance demonstrates unusual reactivity with water.

· HMIS-ratings (scale 0 - 4)


Health = *3
 Fire = 1
 Reactivity = 0

* - Indicates a long term health hazard from repeated or prolonged exposures.

3 Composition/information on ingredients

· Chemical characterization: Mixtures
· Components:

7791-25-5	sulfuryl chloride Skin Corr. 1B, H314 STOT SE 3, H335	25-50%
13450-90-3	gallium trichloride Met. Corr. 1, H290; Skin Corr. 1B, H314; Eye Dam. 1, H318	10-25%
7447-41-8	lithium chloride Acute Tox. 4, H302; Skin Irrit. 2, H315; Eye Irrit. 2A, H319	2.5-10%
7439-93-2	lithium Water-react. 1, H260 Skin Corr. 1B, H314	2.5-10%

· Additional information:

For the listed ingredient(s), the identity and/or exact percentage(s) are being withheld as a trade secret.
 For the wording of the listed Hazard Statements, refer to section 16.

4 First-aid measures

(Cont'd. on page 3)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 2)

- **Description of first aid measures**
- **General information:**
 Information references exposures to battery contents, and not exposures to whole units. Exposures to whole units are unlikely to produce health hazards.
 Immediately remove any clothing soiled by the product.
 Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
 Take affected persons out into the fresh air.
- **After inhalation:**
 Unlikely route of exposure.
 Supply fresh air.
 Seek immediate medical advice.
 Provide oxygen treatment if affected person has difficulty breathing.
 In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:**
 Unlikely route of exposure.
 Immediately rinse with water.
 Seek immediate medical advice.
 Immediate medical treatment necessary. Failure to treat burns can prevent wounds from healing.
- **After eye contact:**
 Unlikely route of exposure.
 Remove contact lenses if worn, if possible.
 Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:**
 Unlikely route of exposure.
 Rinse out mouth and then drink plenty of water.
 Do not induce vomiting; immediately call for medical help.
- **Most important symptoms and effects, both acute and delayed:**
 Adverse health effects are not reasonably expected from normal use of product.
 Coughing
 May cause respiratory irritation.
 Breathing difficulty
 Caustic effect on skin and mucous membranes.
 Eye damage.
- **Danger:**
 Danger of gastric perforation.
 Danger of pulmonary edema.
 Danger of impaired breathing.
 Causes serious eye damage.
 Causes burns.
- **Indication of any immediate medical attention and special treatment needed:**
 Decontaminate patient thoroughly with sodium bicarbonate solution; assume that some skin contact has taken place. Treat other symptoms symptomatically, with emphasis on maintaining electrolyte balance.
 Medical supervision for at least 48 hours.
 If necessary oxygen respiration treatment.

5 Fire-fighting measures

- **Extinguishing media**

(Cont'd. on page 4)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 3)

- **Suitable extinguishing agents:**
Dry sand.
Graphite powder such as Lith-X.
Use only the agents indicated above.
- **For safety reasons unsuitable extinguishing agents:** Water or Halons.
- **Special hazards arising from the substance or mixture**
Information references exposures to battery contents, and not exposures to whole units.
In contact with water releases flammable gases, which may ignite spontaneously.
During heating or in case of fire poisonous gases are produced.
Reacts violently with water.
- **Advice for firefighters**
- **Protective equipment:**
Wear self-contained respiratory protective device.
Do not inhale explosion gases or combustion gases.
Wear fully protective suit.
- **Additional information:** Evacuate area and fight fire from from the upwind side.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Use respiratory protective device against the effects of fumes/dust/aerosol.
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
[In case of inadequate ventilation] wear respiratory protection.
Keep people at a distance and stay upwind.
Do not allow contact with water.
- **Environmental precautions** Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up**
If a spill is small, a trained person may attempt to stop or contain the leak by carefully neutralizing spill with calcium carbonate or sodium bicarbonate. Seal leaking container and neutralized product in a plastic bag and transfer to a lidded container for disposal or recovery. Consult an accredited waste disposal contractor or the local authority for additional advice. Large spills should only be handled by specially trained hazardous materials personnel.
Do not flush with water or aqueous cleansing agents
Send for recovery or disposal in suitable receptacles.
- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Handling**
- **Precautions for safe handling:**
Information is only applicable to product contents, and not to product as normally supplied. This information is applicable to damaged, leaking, or spilled product as contact with contents is possible under these conditions.
Keep away from open flames or temperatures exceeding manufacturer ratings. DO NOT ATTEMPT TO

(Cont'd. on page 5)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 4)

OPEN SEALED CELLS OR BATTERIES – BATTERY CONTENTS MAY PRESENT SERIOUS SAFETY AND HEALTH HAZARDS. SHORT-CIRCUITING THE TERMINALS OF A DEVICE MAY RESULT IN DAMAGE TO DEVICE AND ANY NEARBY OBJECTS OR PERSONNEL.

- **Information about protection against explosions and fires:**

Protect from heat.

Keep respiratory protective device available.

- **Conditions for safe storage, including any incompatibilities**

- **Requirements to be met by storerooms and receptacles:**

Avoid storage near extreme heat, ignition sources or open flame.

Store only in the original receptacle.

Provide ventilation for receptacles.

- **Information about storage in one common storage facility:**

Store away from foodstuffs.

Do not store together with oxidizing and acidic materials.

Do not store together with alkalis (caustic solutions).

- **Further information about storage conditions:**

Avoid storage near extreme heat, ignition sources or open flame.

Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting.

Keep containers tightly sealed.

- **Specific end use(s)** No relevant information available.

8 Exposure controls/personal protection

- **Control parameters**

- **Components with limit values that require monitoring at the workplace:**

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

- **Exposure controls**

- **General protective and hygienic measures:**

The usual precautionary measures for handling chemicals should be followed.

Information is only applicable to product contents, and not to product as normally supplied. This information is applicable to damaged, leaking, or spilled product as contact with contents is possible under these conditions.

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

Do not inhale gases / fumes / aerosols.

Avoid contact with the eyes and skin.

- **Engineering controls:** No relevant information available.

- **Breathing equipment:** For spills, respiratory protection may be advisable.

- **Protection of hands:**

Not required under normal conditions of use.

Wear protective gloves to handle contents of damaged or leaking units.

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

- **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of

(Cont'd. on page 6)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 5)

quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

- **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

- **Eye protection:**

Contact lenses should not be worn.

Not required for normal handling. Wear protective eyewear while handling damaged or leaking product.



Safety glasses

- **Body protection:**

Not required under normal conditions of use.

Protection may be required for spills.

- **Limitation and supervision of exposure into the environment**

No relevant information available.

- **Risk management measures**

See Section 7 for additional information.

No relevant information available.

9 Physical and chemical properties

- **Information on basic physical and chemical properties**

- **Appearance:**

Form:

Solid metal container containing liquid and solid contents.

Color:

Various colors

- **Odor:**

Normally odourless. Leaking devices may emit acrid, sulphurous or ethereal odours.

- **Odor threshold:**

Not determined.

- **pH-value:**

Not determined.

- **Melting point/Melting range:**

Not determined.

- **Boiling point/Boiling range:**

Not determined.

- **Flash point:**

Not applicable.

- **Flammability (solid, gaseous):**

Not applicable.

- **Auto-ignition temperature:**

Not determined.

- **Decomposition temperature:**

Not determined.

- **Danger of explosion:**

Product does not present an explosion hazard.

- **Explosion limits**

Lower:

Not determined.

Upper:

Not determined.

- **Oxidizing properties:**

Not determined.

- **Vapor pressure:**

Not determined.

(Cont'd. on page 7)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 6)

- | | |
|----------------------------|-----------------|
| · Density: | Not determined. |
| · Relative density: | Not determined. |
| · Vapor density: | Not determined. |
| · Evaporation rate: | Not determined. |

- | | |
|--|-----------------|
| · Solubility in / Miscibility with Water: | Not determined. |
|--|-----------------|

- | | |
|---|-----------------|
| · Partition coefficient (n-octanol/water): | Not determined. |
|---|-----------------|

- | | |
|----------------------------|------------------------------------|
| · Viscosity | |
| Dynamic: | Not determined. |
| Kinematic: | Not determined. |
| · Other information | No relevant information available. |

10 Stability and reactivity

- **Reactivity:** No relevant information available.
- **Chemical stability:**
- **Thermal decomposition / conditions to be avoided:**
Danger of receptacles bursting because of high vapor pressure if heated.
Heating may cause release of toxic fumes.
- **Possibility of hazardous reactions**
Hazardous reactions generally occur with contents of leaking batteries only.
Corrosive action on metals.
Toxic fumes may be released if heated above the decomposition point.
May produce violent reactions with bases and numerous organic substances including alcohols and amines.
- **Conditions to avoid**
Excessive heat and contact with oxidizers.
Avoid acids.
- **Incompatible materials** Strong oxidizing agents, bases, amines and aldehydes.
- **Hazardous decomposition products**
Carbon monoxide and carbon dioxide
Sulfur oxides (SO_x)
Chlorine compounds
Toxic metal compounds

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

- | |
|---|
| · LD/LC50 values that are relevant for classification: |
|---|

ATE (Acute Toxicity Estimate)

Oral LD50 >5000 (rat)

7447-41-8 lithium chloride

(Cont'd. on page 8)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 7)

Oral	LD50	526 mg/kg (rat)
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- **Primary irritant effect:**
- **On the skin:**
None from normal handling. Symptoms only seen in exposure to leaking articles.
Strong caustic effect in case of contact with electrolyte only.
- **On the eye:**
None from normal handling. Symptoms only seen in exposure to leaking articles.
Strong caustic effect in case of contact with electrolyte only.
- **Sensitization:** No sensitizing effects known.

- **Carcinogenic categories**

- **IARC (International Agency for Research on Cancer):**

None of the ingredients are listed.

- **NTP (National Toxicology Program):**

None of the ingredients are listed.

- **OSHA-Ca (Occupational Safety & Health Administration):**

None of the ingredients are listed.

- **Probable route(s) of exposure:** None
- **Acute effects (acute toxicity, irritation and corrosivity):**
None from normal handling. Symptoms only seen in exposure to leaking articles.
Harmful if swallowed.
Toxic if inhaled.
Irritating to respiratory system.
Causes severe skin burns and eye damage.
- **Repeated dose toxicity:** None.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity** No relevant information available.
- **Persistence and degradability** Easily biodegradable
- **Bioaccumulative potential:** No relevant information available.
- **Mobility in soil:** No relevant information available.
- **Additional ecological information**
- **General notes:** Avoid transfer into the environment.
- **Other adverse effects** No relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
Contact manufacturer for recycling information.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.

(Cont'd. on page 9)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 8)

- **Uncleaned packagings**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

- **UN-Number**
- **DOT, ADR, IMDG, IATA** UN3090

- **UN proper shipping name**
- **DOT, IATA** Lithium metal batteries
- **ADR, IMDG** LITHIUM METAL BATTERIES

- **Transport hazard class(es)**
- **DOT, IMDG, IATA**



- **Class** 9 Miscellaneous dangerous substances and articles
- **Label** 9A

- **ADR**



- **Class** 9 (M4) Miscellaneous dangerous substances and articles
- **Label** 9A

- **Packing group**
- **DOT, ADR, IMDG, IATA** II

- **Environmental hazards**
- **Marine pollutant:** No

- **Special precautions for user** Warning: Miscellaneous dangerous substances and articles
- **EMS Number:** F-A,S-I

- **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

- **Transport/Additional information:**

- **ADR**
- **Excepted quantities (EQ)** Code: E0
Not permitted as Excepted Quantity

(Cont'd. on page 10)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 9)

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **United States (USA)**
- **SARA**

- **Section 302 (extremely hazardous substances):**

None of the ingredients are listed.

- **Section 355 (extremely hazardous substances):**

13450-90-3 | gallium trichloride

- **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

- **TSCA (Toxic Substances Control Act)**

All ingredients are listed.

- **Proposition 65 (California)**

- **Chemicals known to cause cancer:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

- **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

- **EPA (Environmental Protection Agency):**

None of the ingredients are listed.

- **IARC (International Agency for Research on Cancer):**

None of the ingredients are listed.

- **NIOSH-Ca (National Institute for Occupational Safety and Health):**

None of the ingredients are listed.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Date of preparation / last revision** January 18, 2018 / -

- **Abbreviations and acronyms:**

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

LC50: Lethal concentration, 50 percent

(Cont'd. on page 11)

Safety Data Sheet

Acc. to OSHA HCS (29 CFR 1910.1200)

Printing date: January 18, 2018

Revision: January 18, 2018

Trade name: Lithium Sulfuryl Chloride Metal Batteries with Gallium Electrolyte

(Cont'd. of page 10)

LD50: Lethal dose, 50 percent
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Safety & Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Water-react. 1: Substances and mixtures which in contact with water emit flammable gases – Category 1
Met. Corr. 1: Corrosive to metals – Category 1
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1B: Skin corrosion/irritation – Category 1B
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Eye Irrit. 2A: Serious eye damage/eye irritation – Category 2A
STOT SE 3: Specific target organ toxicity (single exposure) – Category 3

Sources

Website, European Chemicals Agency (echa.europa.eu)
Website, US EPA Substance Registry Services (ofmpub.epa.gov/sorinternet/registry/substreg/home/overview/home.do)
Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)
Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6
Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaassen, Curtis D., ed., ISBN: 978-0-07-176923-5.
Safety Data Sheets, Individual Manufacturers

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