Product:	Lithium Thionyl Chloride ($Li\text{-}SOCl_2$) battery	Applicable Product Numbers:	GAP-9419-H THAAD KVB
Date:	3/15/2024		
Revision:	F	Document Number:	EHS-SDS-1004

SAFETY DATA SHEET

SECTION 1- IDENTIFICATION

Manufacturer Name- EaglePicher Technologies, PO Box 49, Joplin, MO 64802
Emergency Telephone – CHEMTREC: 1-800-424-9300
Recommended use: Power source
Other Means of Identification: None
Telephone for information: 1-417-623-8000
Product Identifier/Name: Lithium Thionyl Chloride Battery
Applicable part number: GAP-9419-H THAAD KVB

SECTION 2- HAZARD(S) IDENTIFICATION

Classification: The batteries described in this SDS are hermetically sealed articles. GHS SDS requirements and classification criteria do not apply to articles or products, such as batteries. The article exemption is found in Section 1.3.2.1.1 of the GHS and reads:
The GHS applies to pure substances and their dilute solutions and to mixtures. "Articles" as defined by the Hazard Communication Standard (29 CFR 1900.1200) of the OSHA of the USA, or by similar definition, are outside the scope of the system."

GHS Label Elements
None required due to battery being classified as an article.

Hazard Statements
Not required to list due to battery being classified as an article.

Precautionary Statements
Not required to list due to battery being classified as an article.

Other Hazards: Violent rupture of battery possible if damaged or an internal short occurs.

Precautions: The risk of chemical exposure exists only in cases of mechanical failure of the battery case allowing contents to be exposed. Thus, the batteries should not be short circuited, punctured, incinerated, dropped, crushed, immersed in water, or exposed to temperatures above the operating temperature range of the battery. In these cases, there is risk of rupture and/or fire.

SECTION 3 - COMPOSITION, INFORMATION ON INGREDIENTS

Chemical Name	C.A.S. Number	Percentage
Thionyl Chloride	7719-09-7	*
Aluminum Chloride	7446-70-0	*
Bromine	7726-95-6	*
Lithium Tetrachloroaluminate	14024-11-4	*
Carbon Black	1333-86-4	*
Platinum Black	7440-06-4	*
Platinum	7440-06-4	*
Nickel – nickel foil	7440-02-0	*

*The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

This battery also contains a squib device and a gas generator within the hermetically sealed battery. Squibs and gas generators are also considered articles under GHS and the OSHA Hazard Communication standard, 29 CFR 1200, and are exempt from the requirements for an SDS. For reference, the following chemicals may be found in squibs and gas generators manufactured by EaglePicher Technologies.

Chemical Name	C.A.S. Number
Boron Calcium Chromate	7440-42-8; 13765-19-0
Barium Nitrate	7440-42-8 and 10022-31-8
Potassium Perchlorate	3811-04-9
Zirconium	7440-67-7
Ferric Oxide	1309-37-1
666 ignition powder*	*
AA2 propellant*	*

*The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret

SECTION 4- FIRST AID MEASURES

In case of battery rupture or major leakage, evacuate personnel from area and provide mechanical ventilation to remove fumes, gases or pungent odor. Seek immediate medical attention for any personnel experiencing symptoms of exposure.

- **Eyes –** Not a probable route of exposure.
- **Skin -** Not a probable route of exposure.
- **Inhalation –** Not a probable route of exposure.
- **Ingestion –** Not a probable route of exposure.

SECTION 5- FIRE FIGHTING MEASURES

Flash Point: Not Applicable	**Flammable Limits in Air % by Volume:** NA	**Extinguishing Media:** Potassium Chloride or Sodium Chloride dry salts. Extinguisher rated for Class D fires.	**Auto-Ignition:** Not Applicable
Special Fire Fighting Procedures	**DO NOT UNDER ANY CIRCUMSTANCES, ATTEMPT TO PUT OUT ANY FIRE WITH WATER OR CO_2 BASED FIRE EXTINGUISHING EQUIPMENT.** If necessary, **smother the fire** with an anhydrous (dry) salt such as KCI (potassium chloride) or NaCl (sodium chloride). DO NOT USE: WATER, SAND, CO2, HALON, OR DRY POWDER EXTINGUISHERS.		
Unusual Fire and Explosion Hazards	Damaged or ruptured batteries may react violently or explode. Evacuate all persons from immediate area of fire.		

SECTION 6- ACCIDENTAL RELEASE MEASURES

PROCEDURES TO CONTAIN AND CLEAN UP LEAKS OR SPILLS: The battery is hermetically sealed and will not leak unless the case is punctured or otherwise damaged. If the battery is punctured or damaged, the battery may react violently. Leave the immediate area of a ruptured or venting battery. Do not attempt cleanup until the battery is stable and personnel are wearing an SCBA and chemical protective clothing and gloves. Do not breathe vapor or mist. Do not enter an enclosed area where a battery has vented without first using mechanical ventilation to clear the space before entry. Cover with sodium bicarbonate or 1:1 mixture of soda ash and sled lime. Transfer into suitable containers.

Dispose of the battery in accordance with federal, state and local regulations. Refer to section 13.

WASTE DISPOSAL METHOD: Follow federal, state and local regulation for proper disposal methods.

OTHER PRECAUTIONS; Never attempt to disassemble, machine, or otherwise modify batteries or injury or death may result.

SECTION 7- HANDLING AND STORAGE

HANDLING
Do not remove the shorting plugs until installation.

If the surface of the battery container is distorted, dented, or punctured before activation, the battery must NOT be activated.

STORAGE – Maximum storage temperature is 60˚ C.

SECTION 8 - EXPOSURE CONTROLS & PERSONAL PROTECTION

	Exposure Limits / Guidelines		
Chemical Name	CAS Number	OSHA Exposure Limits –PEL (TWA)	OTHER TWA
Aluminum Chloride	7446-70-0		2.0 mg/m^3 NIOSH REL
Thionyl Chloride	7719-09-7	1.0 PPM / 5 mg/m^3	
Bromine	7726-95-6	0.1 PPM / 0.7 mg/m^3	
Lithium Tetrachloroaluminate	14024-11-4		
Carbon Black	1333-86-4	3.5 mg/m^3	
Platinum Black	7440-06-4		1 mg/m^3 (metal) ACGIH TWA
Platinum	7440-06-4		1 mg/m^3 NIOSH & ACGIH TWA
Nickel	7440-02-0	1 mg/m^3	

Engineering Controls:
No specific engineering controls are required to prevent exposure to internal components of the hermetically sealed battery.

Exposure Controls:
Personal Protective Equipment:

RESPIRATORY PROTECTION: Not required for normal handling.
PROTECTIVE GLOVES: Not required for normal handling.
EYE/FACE PROTECTION: Not required for normal handling.
OTHER PROTECTIVE EQUIPMENT: Not required for normal handling.

Administrative Controls:
Follow proper handling guidelines in this SDS.

SECTION 9- PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (760 mm Hg)	NA
VAPOR PRESSURE (mm Hg, 25ºC)	NA
VAPOR DENSITY (air=1)	NA
VOLATILE BY VOLUME (%)	NA
EVAPORATION RATE (butyl acetate=1)	NA
PHYSICAL STATE	Solid
SOLUBILITY IN WATER (% by weight)	NA
PH	NA
APPEARANCE	Metallic Geometric Solid Object
ODOR	No odor
ODOR THRESHOLD	NA
MELTING POINT/FREEZING POINT	NA
FLAMMABILITY	NA
UPPER/LOWER FLAMMABILITY EXPLOSIVE LIMITS	NA
RELATIVE DENSITY	NA

PARTITION COEFFICIENT: N-OCTANOL/WATER	NA
AUTO IGNITION TEMPERATURE	NA
DECOMPOSITION TEMPERATURE	NA
VISCOSITY	NA

SECTION 10- STABILITY AND REACTIVITY

1. REACTIVITY: Not Applicable

2. STABLE OR NOT STABLE: Stable

3. INCOMPATIBILITY (MATERIAL TO AVOID): Avoid contact with materials that degrade 316 series stainless steel.

4. HAZARDOUS DECOMPOSITION PRODUCTS: None

5. DECOMPOSITION TEMPERATURE (˚F): N/A
   Maximum storage temperature is 60° C.(140° F).
   Storage at any length of time from 93° C (200° F) – 343° (650° F) can cause degradation of the squib or primer. Storage at any length of time above 343° C (650° F) will cause permanent degradation of the activation device and the battery.

6. HAZARDOUS POLYMERIZATION: Will Not Occur

7. CONDITIONS TO AVOID: Avoid mechanical abuse and electrical abuse such as short-circuiting.

SECTION 11- TOXICOLOGICAL INFORMATION

For battery as an article:

Acute Toxicity: No data available
Skin corrosion/irritation: No data available
Serious eye damage/eye irritation: No data available
Respiratory or skin sensitization: No data available
Germ cell mutagenicity: No data available
Carcinogenicity: No data available
Reproductive toxicity: No data available
Aspiration hazard: Not an aspiration hazard

SIGNS AND SYMPTOMS OF OVEREXPOSURE: Under normal conditions there are no exposures.

The following exposures are possible due to a ruptured or venting battery and exposure to internal contents:

- **Inhalation**- Irritation of the respiratory system, coughing, shortness of breath, burning sensation, vomiting, nausea, headache.
- **Eyes**- Redness, tearing
- **Skin**- May causes skin burn if personnel attempt to handle hot material from a ruptured or venting battery. Internal chemicals may be corrosive and cause irritation.
- **Ingestion**- N/A

SECTION 12- ECOLOGICAL INFORMATION

1. When properly used or disposed of the battery does not present an environmental hazard.
2. Batteries do not contain mercury, cadmium, or lead.
3. Avoid release to waterways, wastewater or ground water.

SECTION 13- DISPOSAL CONSIDERATIONS

Dispose of in accordance with the applicable regulations in country and state. Disposal should be performed by licensed professional disposal firms knowledgeable in Federal, State or Local requirements of hazardous waste treatment and hazardous waste transportation.

SECTION 14- TRANSPORT INFORMATION

Regulatory Status	EaglePicher Technologies, LLC lithium metal batteries are delivered in accordance with current DOT and/or IATA/ICAO regulations. Lithium metal batteries can be shipped by air in accordance with ICAO or IATA. Persons who prepare or offer lithium batteries for transport are required by regulation to be trained to the extent of their responsibility. The transportation of lithium metal batteries is regulated by ICAO, IATA, IMO, ADR and US DOT.		
Total Lithium Content (grams)	**See below for each product number:**		
	Part No.	**Total Lithium Content (grams)**	**Total Cell/Battery Weight (grams)**
	GAP-9419-H	4.1 – 7.8	1039

This battery is classed in accordance with Section 49 CFR 173.56.

DOT (US)	UN Number	Proper Shipping Name	Hazard Class
	UN3090	Lithium Metal Batteries	9

EX Approval Reference Number: EX20020902506

This approval is only valid when the lithium batteries are packaged as follows:
Inner Packaging – Bag, plastic, each containing one lithium battery.
Intermediate Packaging – Box, fiberboard, each containing one inner packaging.
Outer Packaging – Specification 1A2 steel drum, each containing not more than six (6) intermediate packagings with sufficient vermiculite as dunnage to prevent movement during transport.

USA DOT Exceptions for Lithium Cells or Batteries Shipped for Disposal or Recycling: 40 CFR 173.185(d)

Air Transport (IATA/ICAO) Packing Instructions:
PI 968 – Lithium metal batteries (shipped alone)

Marine/Water Transport - IMDG Special Provision: SP188, PI903

ADR.RID Special Provision: 188

Lithium batteries are regarded as dangerous goods based on the above stated regulations when delivered via air, sea, road and train.

A) Each cell or battery is of a type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38-3

B) Cells and batteries are separated so as to prevent short circuits and are packaged in strong packages, except when installed in equipment.

The package and shipping documents are marked indicating that it contains Lithium Batteries and proper labels attached.

SECTION 15- REGULATORY INFORMATION

Batteries, squibs and gas generators are defined as “articles” and thus are exempt from the requirements of the OSHA Hazard Communication Standard, 29 CFR 1910.1200, and the requirements of GHS.

USA OSHA	29 CFR 1910.1200(b)(6)(v)
USA TSCA	40 CFR 704.3; 710.2(3)(c); and [19 CFR 12.1209a)]
EU REACH	Title 1 - Chapter 2 - Article 3(3)
GHS	Section 1.3.2.1

Globally Harmonized System (GHS)	GHS SDS requirements and classification criteria do not apply to articles or products (such as batteries) that have a fixed shape, which are not intended to release a chemical. The article exemption is found in Section 1.3.2.1.1 of the GHS and reads: ***The GHS applies to pure substances and their dilute solutions and to mixtures. "Articles" as defined by the Hazard Communication Standard (29 CFR 1900.1200) of the OSHA of the USA, or by similar definition, are outside the scope of the system."***
Joint Article Management Promotion Consortium JAMP	An international standard that came into effect in March 2012 concerning declaration for electrical and electronic products. IEC 6274 replaces the defunct Joint Industry Guide – Material Declaration for Electro-technical Products (JIG-101-Ed 4.1 (May 21, 2012)
IEC 62474 Ed. 1.0 B:2012 Material Declaration for Products of and for the Electro-technical Industry	An international standard that came into effect in March 2012 concerning declaration for electrical and electronic products. IEC 6274 replaces the defunct Joint Industry Guide – Material Declaration for Electro-technical Products (JIG-101-Ed 4.1 (May 21, 2012)
IEC 62474 Database – Publicly available online (http://std.iec.ch/iec62474). Maintained by TC11: Environmental Standardization for electrical and electronic products and systems.	The general principle for a substance to be included in the database as a declarable substance is: 1) existing national laws or regulations in an IEC member country that are relevant to Electro-technical products and that prohibit or restrict substances, or that have a labeling, communication, reporting or notification requirement, and 2) applying IEC 62474 criteria results in identification of declarable substance.
ANSI Z 400.1/Z19.1 (2010)	2.1 Scope: Applies to preparation of SDS for hazardous chemicals used under occupational conditions. Does not address how the standard may be applied to articles. It presents basic information on how to develop and write a SDS. Additional information is provided to help comply with state and federal environmental and safety laws and regulations. Elements of the standard may be acceptable for international use.

SECTION 16- OTHER INFORMATION

The information and the recommendations set forth are made in good faith and believed to be accurate at the date of preparation.

DISCLAIMER: This SDS is intended to provide a summary of our knowledge and guidance regarding the use of this article. The information contained here has been compiled from sources considered by EaglePicher Technologies, LLC to be dependable and is accurate to the best of the Company's knowledge. It is not meant to be an all-inclusive document on worldwide hazard communication regulations. This information is offered in good faith. Each user of this article needs to evaluate the conditions of use and design the appropriate protective mechanisms to prevent employee exposures, property damage or release to the environment. EaglePicher Technologies, LLC assumes no responsibility for injury to the recipient or third persons or for any damage to any property resulting from misuse of the product.

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