Safety Data Sheet
Lithium-Manganese Button Cell Battery

SDS Revision Date: **12/09/2014**

1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product Identity	Lithium-Manganese Button Cell Battery
Alternate Names	(Lithium Metal Battery), Lithium-Manganese Button Cell Battery, CR 2032

1.2. Relevant identified uses of the substance or mixture and uses advised against

Intended use	See Technical Data Sheet.
Application Method	See Technical Data Sheet.

1.3. Details of the supplier of the safety data sheet

Company Name	Thermco Products, Inc. 10 Millpond Drive, Unit #10 Lafayette, NJ 07848
Emergency	
Customer Service: Thermco Products, Inc.	973.300.9100

2. Hazard identification of the product

2.1. Classification of the substance or mixture

Acute Tox. 4;H302	Harmful if swallowed.
Acute Tox. 4;H332	Harmful if inhaled.
Skin Irrit. 2;H315	Causes skin irritation.
Eye Irrit. 2;H319	Causes serious eye irritation.
Repr. 1B;H360FD	May damage fertility. May damage the unborn child.

2.2. Label elements

Using the Toxicity Data listed in section 11 and 12 the product is labeled as follows.



Danger

H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H360FD* May damage fertility. May damage the unborn child.

[Prevention]:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing dust / fume / gas / mist / vapors / spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves / eye protection / face protection.

[Response]:

P301+312 IF SWALLOWED: Call a POISON CENTER or doctor / physician if you feel unwell.
P302+352 IF ON SKIN: Wash with plenty of soap and water.
P304+340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+351+338 IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.
P308+313 IF exposed or concerned: Get medical advice / attention.
P321 Specific treatment (see information on this label).
P330 Rinse mouth.
P337+313 If eye irritation persists: Get medical advice / attention.
P362 Take off contaminated clothing and wash before reuse.

[Storage]:

P405 Store locked up.

[Disposal]:

P501 Dispose of contents / container in accordance with local / national regulations.

3. Composition/information on ingredients

This product contains the following substances that present a hazard within the meaning of the relevant State and Federal Hazardous Substances regulations.

Ingredient/Chemical Designations	Weight %	GHS Classification	Notes
Stainless Steel **CAS Number: 0065997-19-5**	**50 - 75**	**Not Classified**	**[1]**
Manganese dioxide **CAS Number: 0001313-13-9**	**25 - 50**	**Acute Tox. 4;H332** **Acute Tox. 4;H302**	**[1]**
Perchloric acid, lithium salt **CAS Number: 0007791-03-9**	**1.0 - 10**	**Ox. Sol. 2;H272** **Skin Irrit. 2;H315** **Eye Dam. 2A;H319** **STOT SE 3;H335**	**[1]**
Propylene carbonate **CAS Number: 0000108-32-7**	**1.0 - 10**	**Eye Irrit. 2;H319**	**[1]**
Graphite **CAS Number: 0007782-42-5**	**1.0 - 10**	**Not Classified**	**[1][2]**
Poly(tetrafluoroethene) **CAS Number: 0009002-84-0**	**1.0 - 10**	**Not Classified**	**[1]**
Lithium **CAS Number: 0007439-93-2**	**1.0 - 10**	**Water react. 1;H260** **Skin Corr. 1B;H314**	**[1]**
Ethylene glycol dimethyl ether **CAS Number: 0000110-71-4**	**1.0 - 10**	**Flam. Liq. 2;H225** **Repr. 1B;H360FD** **Acute Tox. 4;H332**	**[1]**

[1] Substance classified with a health or environmental hazard.
[2] Substance with a workplace exposure limit.
[3] PBT-substance or vPvB-substance.
*The full texts of the phrases are shown in Section 16.

4. First aid measures

4.1. Description of first aid measures

General In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.

Inhalation Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate medical attention. Give nothing by mouth.

Eyes Irrigate copiously with clean water for at least 15 minutes, holding the eyelids apart and seek medical attention.

Skin Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.

Ingestion	If swallowed obtain immediate medical attention. Keep at rest. Do NOT induce vomiting.

4.2. Most important symptoms and effects, both acute and delayed

Overview	All chemical materials of lithium-manganese button cell battery cell are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. There is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage during normal use. However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated and hazardous materials may be released. Potential Health Effects: Cobalt and Cobalt compounds are considered to be possible human carcinogen(s). These chemicals may cause allergic skin sensitization (rash) and irritate eyes, skin, nose, throat, respiratory system. Since electrolyte is flammable liquid, it does not bring close to fire. It may cause moderate to severe eye irritation, dryness of the skin. Breathing of its mist, vapor or fume may irritate nose, throat and lungs. Exposure of electrolyte material in the area which contains water may generate hydrofluoric acid, which can cause immediate burns on skin, severe eye burn. The ingestion of electrolyte can cause serious chemical burns of mouth, esophagus and gastrointestinal tract.
Inhalation	Harmful if inhaled.
Eyes	Causes serious eye irritation.
Skin	Causes skin irritation.
Ingestion	Harmful if swallowed.

5. Fire-fighting measures

5.1. Extinguishing media

Recommended extinguishing media; alcohol resistant foam, CO_2, powder, water spray.

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition: Acrid or harmful gas is emitted during fire.

Avoid breathing dust / fume / gas / mist / vapors / spray.

5.3. Advice for fire-fighters

Hazardous Combustion Products: When burned, hazardous products of combustion including fumes of carbon monoxide, carbon dioxide, and fluorine can occur.
Basic Fire Fighting Procedures: Wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

ERG Guide No. ----

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Put on appropriate personal protective equipment (see section 8).

6.2. Environmental precautions

Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

6.3. Methods and material for containment and cleaning up

Procedure for Release and Spill: Sweep up and place in a suitable container, dispose or waste according to all local, state and Federal Laws and Regulations.
Before cleanup measures begin, review the entire MSDS with particular attention Potential Health Effects; and on Recommended Personal Protective Equipment.

7. Handling and storage

7.1. Precautions for safe handling

Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water and seawater. Do not expose to strong oxidizers. Do not give a strong mechanical shock or throw down. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material.

See section 2 for further details. - [Prevention]:

7.2. Conditions for safe storage, including any incompatibilities

Handle containers carefully to prevent damage and spillage.

Incompatible materials: Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.

Storage conditions (suitable, to be avoided): Do not place the battery cell near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in shortened battery cell life and degrade performance.
Store in cool place (temperature: -20-45C, humidity: 45-75%).
Incompatible products: Conductive materials, water, seawater, strong oxidizers and strong acids
Packing material (recommended, not suitable): Insulative and tearproof materials are recommended.

See section 2 for further details. - [Storage]:

7.3. Specific end use(s)

No data available.

8. Exposure controls and personal protection

8.1. Control parameters

Exposure

CAS No.	Ingredient	Source	Value
0000108-32-7	Propylene carbonate	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0000110-71-4	Ethylene glycol dimethyl ether	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0001313-13-9	Manganese dioxide	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0007439-93-2	Lithium	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0007782-42-5	Graphite	OSHA	TWA 15 mg/m3TWA 15 mppcf
		ACGIH	TWA: 2 mg/m3
		NIOSH	TWA 2.5 mg/m3 (resp)
		Supplier	No Established Limit
0007791-03-9	Perchloric acid, lithium salt	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0009002-84-0	**Poly(tetrafluoroethene)**	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit
0065997-19-5	Stainless Steel	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit

Carcinogen Data

CAS No.	Ingredient	Source	Value
0000108-32-7	Propylene carbonate	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0000110-71-4	Ethylene glycol dimethyl ether	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0001313-13-9	Manganese dioxide	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0007439-93-2	Lithium	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0007782-42-5	Graphite	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0007791-03-9	Perchloric acid, lithium salt	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;
0009002-84-0	**Poly(tetrafluoroethene)**	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: Yes; Group 4: No;
0065997-19-5	Stainless Steel	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;

8.2. Exposure controls

Respiratory Avoid breathing dust and processing vapors. When adequate ventilation is not available, wear a NIOSH/MSHA respirator approved for protection against inorganic dusts.

Eyes Use good industrial practice to avoid eye contact. Processing of this product releases vapors or fumes which may cause eye irritation. Where eye contact may be likely wear chemical googles and have eye flushing equipment.

Skin Minimize skin contamination by following good industrial hygiene practices. Wearing protective gloves is recommended. Wash hands and contaminated available skin thoroughly after handling.
Special clothing: Rubber gloves.

Engineering Controls Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and any vapor below occupational exposure limits suitable respiratory protection must be worn.

Other Work Practices Eye flushing equipment. Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

See section 2 for further details. - [Prevention]:

9. Physical and chemical properties

Appearance	Metallic (without outer PVC cover) Solid
Odor	No
Odor threshold	Not Measured
pH	NA
Melting point / freezing point	NA
Initial boiling point and boiling range	NA
Flash Point	38C (CC) (100F)
Evaporation rate (Ether = 1)	NA
Flammability (solid, gas)	Not Applicable
Upper/lower flammability or explosive limits	**Lower Explosive Limit:** 1.4
	Upper Explosive Limit: 11
Vapor pressure (Pa)	NA
Vapor Density	NA
Specific Gravity	NA
Solubility in Water	Not Measured
Partition coefficient n-octanol/water (Log Kow)	Not Measured
Auto-ignition temperature	NA
Decomposition temperature	NA
Viscosity (cSt)	NA
VOC %	NA

9.2. Other information

No other relevant information.

10. Stability and reactivity

10.1. Reactivity

Hazardous Polymerization will not occur.

10.2. Chemical stability

Stable under normal circumstances.

10.3. Possibility of hazardous reactions

Hazardous reactions may occur under some specific conditions.

10.4. Conditions to avoid

When a battery cell is exposed to an external short-circuit, crushes, modification, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Avoid to be exposed to direct sunlight and high humidity.

10.5. Incompatible materials

Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.

10.6. Hazardous decomposition products

Acrid or harmful gas is emitted during fire.

11. Toxicological information

Acute toxicity

Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation Vapor LD50, mg/L/4hr	Inhalation Dust/Mist LD50, mg/L/4hr	Inhalation Gas LD50, ppm
Stainless Steel - (65997-19-5)	No data available	No data available	No data available	No data available	No data available
Manganese dioxide - (1313-13-9)	No data available	No data available	No data available	No data available	No data available
Perchloric acid, lithium salt - (7791-03-9)	No data available	No data available	No data available	No data available	No data available
Propylene carbonate - (108-32-7)	29,000.00, Rat - Category: NA	23,780.00, Rabbit - Category: NA	No data available	No data available	No data available
Graphite - (7782-42-5)	No data available	No data available	No data available	No data available	No data available
Poly(tetrafluoroethene) - (9002-84-0)	No data available	No data available	No data available	No data available	No data available
Lithium - (7439-93-2)	No data available	No data available	No data available	No data available	No data available
Ethylene glycol dimethyl ether - (110-71-4)	No data available	No data available	No data available	No data available	No data available

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

Classification	Category	Hazard Description
Acute toxicity (oral)	4	Harmful if swallowed.
Acute toxicity (dermal)	---	Not Applicable

Acute toxicity (inhalation)	4	Harmful if inhaled.
Skin corrosion/irritation	2	Causes skin irritation.
Serious eye damage/irritation	2	Causes serious eye irritation.
Respiratory sensitization	---	Not Applicable
Skin sensitization	---	Not Applicable
Germ cell mutagenicity	---	Not Applicable
Carcinogenicity	---	Not Applicable
Reproductive toxicity	1B	May damage fertility. May damage the unborn child.
STOT-single exposure	---	Not Applicable
STOT-repeated exposure	---	Not Applicable
Aspiration hazard	---	Not Applicable

12. Ecological information

12.1. Toxicity

Since some materials remain in the environment, do not bury or throw out into the environment. See Section 3 for chemical specific data.

Aquatic Ecotoxicity

Ingredient	96 hr LC50 fish, mg/l	48 hr EC50 crustacea, mg/l	ErC50 algae, mg/l
Stainless Steel - (65997-19-5)	Not Available	Not Available	Not Available
Manganese dioxide - (1313-13-9)	Not Available	Not Available	Not Available
Perchloric acid, lithium salt - (7791-03-9)	Not Available	Not Available	Not Available
Propylene carbonate - (108-32-7)	5,300.00, Leuciscus idus	500.00, Daphnia magna	500.00 (72 hr), Scenedesmus subspicatus
Graphite - (7782-42-5)	Not Available	Not Available	Not Available
Poly(tetrafluoroethene) - (9002-84-0)	Not Available	Not Available	Not Available
Lithium - (7439-93-2)	Not Available	Not Available	Not Available
Ethylene glycol dimethyl ether - (110-71-4)	Not Available	Not Available	Not Available

12.2. Persistence and degradability

There is no data available on the preparation itself.

12.3. Bioaccumulative potential

Not Measured

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

This product contains no PBT/vPvB chemicals.

12.6. Other adverse effects

No data available.

13. Disposal considerations

13.1. Waste treatment methods

Observe all federal, state and local regulations when disposing of this substance.

14. Transport information

US DOT, All batteries are not subject to the requirements of the Department of Transportation (DOT) subchapter C, Hazardous Material Regulations since each battery meets the exceptions under 173.185 (b). The batteries are exempted from the US DOT regulations as long as they are separated to prevent short circuits and packed in strong packing for conditions normally encountered in transportation.

ICAO and IATA, all batteries are regulated as Hazardous Material by the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) They must be transported according to 2014 section 38.3 and Drop test of Section II of Packing Instruction 968-970 of 55th DGR Manual of IATA. The Lithium Cell (CR2032) have passed the test UN38.3, according to the report ID:RZUN2012-0831

IMO, all batteries are regulated as Hazardous Material by the International Maritime Organization (IMO) when transporting more than 24 batteries or 12 batteries in a single package. These must be transported according to the requirement in the Special Provisions “188” and “230”

ADR, RID, all batteries are regulated as Hazardous Material by the ADR (road) and RID (rail) when transporting more than 24 batteries and 12 batteries in a single package. These must be transported according to the requirement in Special Provisions “188” and “230”

Building of new battery pack- if you build any of lithium batteries into batter pack, you must assure that they are being tested in accordance.

15. Regulatory information

Regulatory Overview	The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.
Toxic Substance Control Act (TSCA)	All components of this material are either listed or exempt from listing on the TSCA Inventory.
WHMIS Classification	D2A
US EPA Tier II Hazards	**Fire:** No
	Sudden Release of Pressure: No
	Reactive: No
	Immediate (Acute): Yes
	Delayed (Chronic): No

EPCRA 311/312 Chemicals and RQs:
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

EPCRA 302 Extremely Hazardous :
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

EPCRA 313 Toxic Chemicals:

Ethylene glycol dimethyl ether

Manganese dioxide

Proposition 65 - Carcinogens (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Developmental Toxins (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Female Repro Toxins (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

Proposition 65 - Male Repro Toxins (>0.0%):
To the best of our knowledge, there are no chemicals at levels which require reporting under this statute.

N.J. RTK Substances (>1%):

Ethylene glycol dimethyl ether

Graphite

Lithium

Penn RTK Substances (>1%):

Ethylene glycol dimethyl ether

Graphite

Lithium

Poly(tetrafluoroethene)

16. Other information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

The full text of the phrases appearing in section 3 is:

H225 Highly flammable liquid and vapor.

H260 In contact with water releases flammable gases which may ignite spontaneously.

H302 Harmful if swallowed.

H314 Causes severe skin burns and eye damage.

H319 Causes serious eye irritation.

H332 Harmful if inhaled.

H360FD May damage fertility. Suspected of damaging the unborn child.

This is the first version in the GHS SDS format. Listings of changes from previous versions in other formats are not applicable.

Disclaimer: This information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

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