


1. Identification

Product identifier	Lithium-ion Battery
Other means of identification	None.
Recommended use	Battery for light electric vehicles.
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Company name	Trojan Battery Company, LLC
Address	12380 Clark Street Santa Fe Springs, CA 90670 United States of America
Website	www.trojanbattery.com
Telephone	+1(562) 236-3000 or +1(800) 423-6569
Technical contact	+1(978) 727-2206 or +1(610) 858-6192
Emergency telephone	CHEMTREC: (800) 424-9300 International: +1(703) 527-3887

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Specific target organ toxicity, repeated exposure	Category 1 (bones, teeth)
	Specific target organ toxicity, repeated exposure (oral)	Category 2 (kidneys)
OSHA defined hazards	Not classified.	
Label elements		

Signal word	Danger
Hazard statement	The materials contained in this product may only represent a hazard if the integrity of the cell or battery is compromised. Listed below are the hazards anticipated when the battery is physically, thermally, or electrically abused: Harmful if swallowed. Causes skin irritation. Causes serious eye irritation. Causes damage to organs (bones, teeth) through prolonged or repeated exposure. May cause damage to organs (kidneys) through prolonged or repeated exposure by ingestion.
Precautionary statement	
Prevention	Keep out of reach of children. Do not breathe fumes or vapors. Do not eat, drink or smoke when using this product. Wear protective gloves/eye protection/face protection.
Response	If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. If on skin: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Storage	Store as indicated in Section 7.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information Under normal conditions of processing and use, exposure to the chemical constituents in this product is unlikely. Batteries may get hot, explode or ignite and cause serious injury if mishandled, crushed or abused. When exposed to heat, when short circuited, or when exposed to incompatible materials, the battery may rupture and release hazardous substances. These substances can explode and burn. Burning batteries may emit toxic fumes.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Phosphoric acid, iron (2+) lithium salt (1:1:1)	15365-14-7	30.08
Graphite	7782-42-5	15.97
Copper	7440-50-8	6.99
Dimethyl carbonate	616-38-6	6.49
Ethylene carbonate	96-49-1	4.52
Aluminum	7429-90-5	3.45
Lithium hexafluorophosphate(1-)	21324-40-3	1.95
Ethyl methyl carbonate	623-53-0	1.84
Carbon black	1333-86-4	0.96

Composition comments The ingredients listed in section 3 are contained in a sealed can, inside a sealed container. Risk of exposure only occurs if battery is mechanically, thermally or electrically abused. All concentrations are in percent by weight unless otherwise indicated. Components not listed are either non-hazardous or are below reportable limits.

4. First-aid measures

Inhalation Exposure to contents of an open or damaged battery: Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Exposure to contents of an open or damaged battery: Remove contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Seek medical attention if irritation develops and persists.

Eye contact Exposure to contents of an open or damaged battery: Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention if irritation develops and persists.

Ingestion Exposure to contents of an open or damaged battery: Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Seek medical advice/attention if you feel unwell.

Most important symptoms/effects, acute and delayed Under normal conditions of intended use, this product is not expected to be a health risk. Exposure to contents of an open or damaged battery: Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep the individual who was exposed warm and under observation. Symptoms may be delayed.

General information If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media ABC, BC, CO2 fire extinguishers. Dry sand.

Unsuitable extinguishing media Leak from a damaged or opened battery: Do not use water unless flooding amounts are available.

Specific hazards arising from the chemical Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of corrosive and flammable materials. During fire, hazardous combustion products are released that may include: Carbon oxides. Fumes of metal oxides.

Special protective equipment and precautions for firefighters Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.

Fire fighting equipment/instructions

In the event of fire and/or explosion do not breathe fumes. Fight fire from protected location or safe distance. Keep upwind. Move containers from fire area if you can do so without risk. Avoid allowing material from exposed battery to contaminate soil, sanitary sewers, or waterways.

Specific methods

Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards

Under normal use, the battery does not exhibit flammable properties. In the event that the battery is abused and disassembly of the battery occurs resulting in exposure of internal components, the exposed solution may be flammable and/or corrosive. Exposure to excessive heat may lead to venting or rupture of the sealed battery, exposing the internal components which may be corrosive and/or flammable. Vented gas would be flammable when in sufficient concentration.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. In the event of damage resulting in a leak or exposed materials, avoid contact with contents of an open or damaged cell or battery. Do not breathe fumes or vapors. Provide adequate ventilation. Wear protective clothing as described in Section 8 of this safety data sheet.

Methods and materials for containment and cleaning up

Recover and recycle, if practical. Leak from a damaged or opened battery: Contain spillage with sand or earth. Place in a designated labeled waste container, dispose as hazardous waste. For waste disposal, see Section 13 of the SDS.

Environmental precautions

Avoid allowing material from exposed battery to contaminate soil, sanitary sewers, or waterways.

7. Handling and storage

Precautions for safe handling

CAUTION: Do not dispose in fire, mix with other battery types, charge above specified rate, connect improperly, or short circuit, which may result in overheating, explosion or leakage of cell contents. Do not open, disassemble, crush or burn battery. Do not expose battery to extreme heat or fire. Do not allow conductive material to touch the battery terminals. A dangerous short-circuit may occur and cause battery failure and fire. Batteries are designed to be recharged. However, improperly charging a cell or battery may cause the product to flame or leak. Use only approved chargers and procedures. Extended short-circuiting creates high temperatures in the cell. Avoid reversing the battery polarity within the battery assembly. To do so may cause the cell to flame or leak. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep out of reach of children. Batteries should be separated from other materials and stored in a non-combustible, well ventilated structure with sufficient clearance between walls and battery stacks. Do not place batteries near heating equipment. Store in a cool, dry place. Avoid contact with water and moisture. Protect from humidity. Do not store batteries in a manner that allows terminals to short circuit. Store away from incompatible materials (See Section 10).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Permissible Exposure Limits (PEL) for Air Contaminants (29 CFR 1910.1000)

Components		Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		1 mg/m3	Respirable dust.
Carbon black (CAS 1333-86-4)	TWA	3.5 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Graphite (CAS 7782-42-5)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 Permissible Exposure Limits (PEL) for Mineral Dusts (29 CFR 1910.1000)

Components		Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Graphite (CAS 7782-42-5)	TWA	15 mppcf	

US. ACGIH Threshold Limit Values (TLV)

Components		Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Carbon black (CAS 1333-86-4)	TWA	3 mg/m3	Inhalable fraction.
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Graphite (CAS 7782-42-5)	TWA	2 mg/m3	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards Recommended Exposure Limits (REL)

Components		Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mg/m3	Welding fume or pyrophoric powder.
		5 mg/m3	Respirable.
		10 mg/m3	Total
Carbon black (CAS 1333-86-4)	TWA	3.5 mg/m3	
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Graphite (CAS 7782-42-5)	TWA	2.5 mg/m3	Respirable.

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

Airborne exposures to hazardous substances are not expected when product is used for its intended purpose. The OELs listed above are only applicable if the internal components of the battery cell are released.

Appropriate engineering controls

Ventilation is not normally required. Leak from a damaged or opened battery: Provide adequate ventilation if fumes or vapors are generated.

Individual protection measures, such as personal protective equipment**Eye/face protection**

None under normal conditions. Wear chemical goggles if handling an open or leaking battery.

Skin protection**Hand protection**

None under normal conditions. Leak from a damaged or opened battery: Wear chemical-resistant, impervious gloves. Suitable gloves can be recommended by the glove supplier.

Other

None under normal conditions. Leak from a damaged or opened battery: Wear suitable coveralls to prevent exposure to the skin.

Respiratory protection

None under normal conditions. Leak from a damaged or opened battery: In case of insufficient ventilation, wear suitable respiratory equipment. Follow OSHA respirator regulations (29CFR 1910.134) and use NIOSH/MSHA approved respirators. Check with respiratory protective equipment suppliers.

Thermal hazards

No protection is ordinarily required under normal conditions of use.

General hygiene considerations

Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties**Appearance****Physical state**

Solid.

Form

Cylindrical battery.

Color

No data available.

Odor

Odorless. If leaking, smells of medical ether.

Odor threshold

Not applicable unless individual components exposed.

pH

Not applicable unless individual components exposed.

Melting point/freezing point

Not applicable unless individual components exposed.

Initial boiling point and boiling range

Not applicable unless individual components exposed.

Flash point

Not applicable unless individual components exposed.

Evaporation rate

Not applicable unless individual components exposed.

Flammability (solid, gas)	Contains one or more components that will burn if involved in a fire.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not applicable unless individual components exposed.
Explosive limit - upper (%)	Not applicable unless individual components exposed.
Vapor pressure	Not applicable unless individual components exposed.
Vapor density	Not applicable unless individual components exposed.
Relative density	Not determined.
Solubility(ies)	
Solubility (water)	Not applicable unless individual components exposed.
Partition coefficient (n-octanol/water)	Not applicable unless individual components exposed.
Auto-ignition temperature	Not applicable unless individual components exposed.
Decomposition temperature	Not applicable unless individual components exposed.
Viscosity	Not applicable unless individual components exposed.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport. Damaged non-discharged batteries contain elemental Lithium that is water reactive. This reaction gives off heat and hydrogen gas.
Chemical stability	Product is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Heat, sparks, flames, elevated temperatures. Protect from temperatures above: 158°F/70°C. Protect against direct sunlight. Water, moisture. Humidity. Shocks and physical damage. Do not open, disassemble, crush or burn battery. Do not allow conductive material to touch the battery terminals. A dangerous short-circuit may occur and cause battery failure and fire.
Incompatible materials	Strong oxidizing agents. Strong alkalis. Mineral acids. Halogenated hydrocarbons. Do not immerse in seawater or other high conductivity liquids.
Hazardous decomposition products	Irritating and/or toxic fumes and gases may be emitted upon the products decomposition. May form peroxides. For hazardous combustion products, see section 5.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Under normal conditions of intended use, this material is not expected to be an inhalation hazard. Exposure to contents of an open or damaged battery: Prolonged inhalation may be harmful.
Skin contact	Under normal conditions of intended use, this material does not pose a skin hazard. Exposure to contents of an open or damaged battery: Causes skin irritation.
Eye contact	Under normal conditions of intended use, this material does not pose an eye hazard. Exposure to contents of an open or damaged battery: Causes serious eye irritation.
Ingestion	Under normal conditions of intended use, this material does not pose a risk to health. Exposure to contents of an open or damaged battery: Harmful if swallowed. May cause damage to organs through prolonged or repeated exposure by ingestion.

Symptoms related to the physical, chemical and toxicological characteristics	Under normal conditions of intended use, this product is not expected to be a health risk. Exposure to contents of an open or damaged battery: Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.
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Information on toxicological effects

Acute toxicity	Exposure to contents of an open or damaged battery: Harmful if swallowed.
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Components	Species	Test Results
Carbon black (CAS 1333-86-4)		
Acute		
Dermal		
LD50	Rabbit	> 3000 mg/kg

Components	Species	Test Results
Oral LD50	Rat	> 8000 mg/kg
Ethylene carbonate (CAS 96-49-1)		
Acute Oral LD50	Rat	10 g/kg
Skin corrosion/irritation	Exposure to contents of an open or damaged battery: Causes skin irritation.	
Serious eye damage/eye irritation	Exposure to contents of an open or damaged battery: Causes serious eye irritation.	
Respiratory or skin sensitization		
Respiratory sensitization	Not a respiratory sensitizer.	
Skin sensitization	This product is not expected to cause skin sensitization.	
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.	
Carcinogenicity	Inhalation of carbon black dust may cause cancer, however due to the physical form of the product, inhalation of dust is not likely.	

IARC Monographs. Overall Evaluation of Carcinogenicity

Carbon black (CAS 1333-86-4) 2B Possibly carcinogenic to humans.

NTP Report on Carcinogens

Carbon black (CAS 1333-86-4) Known To Be Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.	
Specific target organ toxicity - single exposure	Not classified.	
Specific target organ toxicity - repeated exposure	Exposure to contents of an open or damaged battery: Causes damage to organs (bones, teeth) through prolonged or repeated exposure. May cause damage to organs (kidneys) through prolonged or repeated exposure by ingestion.	
Aspiration hazard	Not an aspiration hazard.	
Chronic effects	Exposure to contents of an open or damaged battery: Prolonged inhalation may be harmful. Causes damage to organs through prolonged or repeated exposure.	
Further information	Exposure to hazardous ingredients is not anticipated under normal conditions of use.	

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components	Species	Test Results
Carbon black (CAS 1333-86-4)		
Aquatic		
<i>Acute</i>		
Fish	LC50	Leuciscus idus > 1000 mg/l, 96 Hours
Copper (CAS 7440-50-8)		
Aquatic		
<i>Chronic</i>		
Other	NOEC	Juga plicifera 6 µg/l
Graphite (CAS 7782-42-5)		
Aquatic		
Fish	LC50	Oncorhynchus mykiss > 1000 mg/l
Persistence and degradability	The product contains inorganic compounds which are not biodegradable.	
Bioaccumulative potential	No data available on bioaccumulation.	
Mobility in soil	The product is not mobile in soil. Some components from a leaking battery may be mobile.	
Other adverse effects	No data available for this product.	

13. Disposal considerations

Disposal instructions	Recycle the batteries as the primary disposal method. Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN3480
UN proper shipping name	Lithium ion batteries
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	-
Environmental hazards	
Marine pollutant	No
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Packaging exceptions	49CFR 173.185
Packaging non bulk	49CFR 173.185
Packaging bulk	None

IATA

UN number	UN3480
UN proper shipping name	Lithium ion batteries
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	-
Environmental hazards	No
ERG Code	12FZ
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN3480
UN proper shipping name	LITHIUM ION BATTERIES
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Packing group	-
Environmental hazards	
Marine pollutant	No
EmS	F-A, S-I
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
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TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Copper (CAS 7440-50-8) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Toxic Substances Control Act (TSCA)

All components of the mixture on the TSCA 8(b) inventory are designated "active".

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum	7429-90-5	3.45
Copper	7440-50-8	6.99

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

- Aluminum (CAS 7429-90-5)
- Carbon black (CAS 1333-86-4)
- Copper (CAS 7440-50-8)
- Ethylene carbonate (CAS 96-49-1)
- Graphite (CAS 7782-42-5)

US. New Jersey Worker and Community Right-to-Know Act

- Aluminum (CAS 7429-90-5)
- Carbon black (CAS 1333-86-4)
- Copper (CAS 7440-50-8)
- Graphite (CAS 7782-42-5)

US. Pennsylvania Worker and Community Right-to-Know Law

- Aluminum (CAS 7429-90-5)
- Carbon black (CAS 1333-86-4)
- Copper (CAS 7440-50-8)
- Ethylene carbonate (CAS 96-49-1)
- Graphite (CAS 7782-42-5)

US. Rhode Island RTK

- Aluminum (CAS 7429-90-5)
- Carbon black (CAS 1333-86-4)
- Copper (CAS 7440-50-8)
- Graphite (CAS 7782-42-5)

California Proposition 65



WARNING: This product can expose you to Carbon black, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Carbon black (CAS 1333-86-4)

Listed: February 21, 2003

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Aluminum (CAS 7429-90-5)

Carbon black (CAS 1333-86-4)

Copper (CAS 7440-50-8)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Industrial Chemicals (AICIS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	03-August-2021
Revision date	-
Version #	01
NFPA ratings	

**Disclaimer**

Trojan Battery Company, LLC cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. Users should review this information and perform the necessary due diligence to determine the suitability of the information for their particular use. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information above was written based on the best information currently available to us.