Lithium-ion Cell

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Issue date: 6/26/2024 Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form	:	Article
Trade name	:	Lithium-ion Cell
Product code	:	40086

1.2. Recommended use and restrictions on use

Use of the substance/mixture	:	Batteries and accumulators
Restrictions on use	:	No additional information available

1.3. Supplier

Supplier
ITW Global Tire Repair, Inc.
125 Venture Drive, Suite 210, San Luis Obispo, CA 93401, USA
Tel: (888) 457-5463 (Toll Free)

1.4. Emergency telephone number

Emergency number	:	Chemtel: +1(813)248-0585 (International)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Not classified

2.2. GHS Label elements, including precautionary statements

GHS US labeling

No labeling applicable

2.3. Other hazards which do not result in classification

Other hazards which do not result in classification	:	This product is not classified as hazardous but contains hazardous components. Risk of exposure only occurs if the battery cell is mechanically, thermally, or electrically abused and the enclosure is compromised. If this occurs, exposure to electrolyte solutions contained in the battery cell may occur by inhalation, eye contact, skin contact, or ingestion. The batteries described in this Safety Data Sheet are sealed units which are not hazardous when used according to the Manufacturer's recommendations.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS US classification
Lithium manganese oxide (LiMn2O4)	CAS-No.: 12057-17-9	≥ 25 – < 40	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Aquatic Chronic 4, H413
Graphite	CAS-No.: 7782-42-5	≥ 15 – < 20	Not classified
Cobalt lithium manganese nickel oxide	CAS-No.: 182442-95-1	≥ 10 – < 15	Acute Tox. 2 (Inhalation), H330 Carc. 1B, H350 STOT RE 1, H372 Aquatic Chronic 3, H412
Aluminium	CAS-No.: 7429-90-5	≥ 2.5 – < 5	Water-react. 2, H261 Flam. Sol. 1, H228
Copper	CAS-No.: 7440-50-8	≥ 2.5 – < 5	Aquatic Chronic 2, H411
Ethylene carbonate	CAS-No.: 96-49-1	≥ 2.5 – < 5	Acute Tox. 4 (Oral), H302 Eye Irrit. 2A, H319 STOT RE 2, H373
Lithium hexafluorophosphate(1-)	CAS-No.: 21324-40-3	≥ 1 – < 2.5	Acute Tox. 3 (Oral), H301 Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT RE 1, H372

*Chemical name, CAS number and/or exact concentration have been withheld as a trade secret

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : If medical advice is needed, have product container or label at hand. Never give anything by mouth to an unconscious person.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a physician immediately. Give oxygen or artificial respiration if necessary.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. If skin irritation or rash occurs: Get medical advice/attention.

First-aid measures after eye contact : 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.

First-aid measures after ingestion : Rinse mouth out with water. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects : Risk of exposure only occurs if the battery cell is mechanically, thermally, or electrically abused and the enclosure is compromised. If this occurs, exposure to electrolyte solutions contained in the battery cell may occur by inhalation, eye contact, skin contact, or ingestion.

Symptoms/effects after inhalation : Vapors or mists from a ruptured battery may cause respiratory irritation. Danger of serious damage to health by prolonged exposure through inhalation. Fatal if inhaled.

Symptoms/effects after skin contact : Skin contact with a ruptured battery can cause skin irritation. Redness. Itching. Swelling.

Symptoms/effects after eye contact : Eye contact with the contents of a ruptured battery can cause severe irritation to the eye. Redness. Lacrimation. Itching. Blurred vision.

Symptoms/effects after ingestion : Harmful if swallowed. May cause gastrointestinal irritation, nausea, vomiting and diarrhea. Abdominal pain. Swallowing this material will result in serious health hazard, potentially leading to collapse and death.

Chronic symptoms : May cause cancer. Causes damage to organs through prolonged or repeated exposure.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	:	Carbon dioxide. Foam. Dry powder. Water spray. Use extinguishing agent suitable for surrounding fire.
Unsuitable extinguishing media	:	Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Fire hazard	:	Burning produces stinking and toxic fumes. In case of fire and/or explosion do not breathe fumes.
Explosion hazard	:	Explosion risk in case of fire.
Reactivity in case of fire	:	Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapors. Reacts violently with water.
Hazardous decomposition products in case of fire	:	Toxic fumes may be released. Carbon dioxide. Carbon monoxide. Hydrogen fluoride. Lithium Oxide. Metal oxides.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions	:	Evacuate the danger area. Move containers from fire area if it can be done without personal risk. Exercise caution when fighting any chemical fire. Fight fire with normal precautions from a reasonable distance. Use water spray or fog for cooling exposed containers. Prevent fire-fighting water from entering environment.
Protection during firefighting	:	Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment	:	Wear recommended personal protective equipment.
Emergency procedures	:	Evacuate unnecessary personnel. Ventilate spillage area. Avoid breathing vapors, fume. Do not get in eyes, on skin, or on clothing. Do not touch or walk on the spilled product. No action shall be taken without appropriate training or involving any personal risk.

6.1.2. For emergency responders

Protective equipment	:	Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures	:	Evacuate unnecessary personnel.

6.2. Environmental precautions

Avoid release to the environment. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	:	Stop leak, if possible without risk.
Methods for cleaning up	:	Move containers from spill area. Mechanically recover the product. Clean up any spills as soon as possible, using an absorbent material to collect it. Place in a suitable container for disposal in accordance with the waste regulations (see Section 13). Prevent entry to sewers and public waters.

Other information : Dispose of via an authorised person/ licensed waste disposal contractor or by other suitable waste treatment techniques.

6.4. Reference to other sections

For further information refer to section 13. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Provide local exhaust or general room ventilation. Wear personal protective equipment. Avoid contact with skin and eyes. Take precautionary measures against static discharge. Do not short circuit, puncture, incinerate, crush, immerse in water, or expose to temperatures outside the temperature range stipulated by the manufacturer for the product. If this occurs, electrolyte leakage, or battery vent/explosion/fire may also occur depending on the circumstances.

Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Always wash hands after handling the product. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a dry place. Keep cool. Keep away from food, drink and animal feed. Proper grounding procedures to avoid static electricity should be followed. Protect from moisture. Protect from freezing. Store in accordance with local, regional, national or international regulation.

Incompatible products : Strong acids. Strong bases. Strong oxidizing agents.

Incompatible materials : Direct sunlight. Keep away from any possible contact with water.

Heat and ignition sources : Do not expose the battery to high temperatures or fire.

Storage area : Store in dry, cool, well-ventilated area.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Lithium-ion Cell
No additional information available

Cobalt lithium manganese nickel oxide (182442-95-1)
No additional information available

Graphite (7782-42-5)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Graphite (all forms excepte graphite fibers)
ACGIH OEL TWA	2 mg/m³ (R - Respirable particulate matter)
Remark (ACGIH)	TLV® Basis: Pneumoconiosis
Regulatory reference	ACGIH 2022
USA - OSHA - Occupational Exposure Limits	
Local name	Graphite (Natural)
OSHA PEL TWA	15 mppcf

Graphite (7782-42-5)	
Remark (OSHA)	Table Z-3. CAS No. source: eCFR Table Z-1.
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-3 Mineral Dusts

Lithium hexafluorophosphate(1-) (21324-40-3)
No additional information available

Copper (7440-50-8)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Copper, as Cu
ACGIH OEL TWA	0.2 mg/m³ (Fume) 1 mg/m³ (Dusts and mists)
Remark (ACGIH)	TLV® Basis: Irr; GI; metal fume fever
Regulatory reference	ACGIH 2024
USA - OSHA - Occupational Exposure Limits	
Local name	Copper
OSHA PEL TWA	0.1 mg/m³ (Fume (as Cu)) 1 mg/m³ (Dusts and mists (as Cu))
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

Aluminium (7429-90-5)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Aluminum metal and insoluble compounds
ACGIH OEL TWA	1 mg/m³ (R - Respirable particulate matter)
Remark (ACGIH)	TLV® Basis: Pneumoconiosis; LRT irr; neurotoxicity. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2024
USA - OSHA - Occupational Exposure Limits	
Local name	Aluminum Metal (as Al)
OSHA PEL TWA	15 mg/m³ (Total dust) 5 mg/m³ (Respirable fraction)
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

Ethylene carbonate (96-49-1)
No additional information available

Lithium manganese oxide (LiMn2O4) (12057-17-9)
No additional information available

Monitoring methods	
Monitoring methods	Refer to all applicable national, international and local regulations or provisions.

8.2. Appropriate engineering controls

Appropriate engineering controls : Provide local exhaust or general room ventilation. Handle in accordance with good industrial hygiene and safety procedures. Avoid all unnecessary exposure. Ensure exposure is below occupational exposure limits (where available).

Environmental exposure controls : Avoid release to the environment. Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Wear recommended personal protective equipment. Personal protective equipment should be chosen according to the NIOSH standards and in discussion with the supplier of the protective equipment.

Hand protection:
Not required for normal conditions of use. In case of skin contact. Chemical resistant gloves (according to NIOSH standard)

Eye protection:
No special eye protection equipment recommended under normal conditions of use

Skin and body protection:
No special clothing/skin protection equipment is recommended under normal conditions of use

Respiratory protection:
No respiratory protection needed under normal use conditions

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Solid
Appearance	:	batteries.
Color	:	According to product specification
Odor	:	odorless
Odor threshold	:	No data available
pH	:	No data available
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	No data available
Flash point	:	No data available
Relative evaporation rate (butyl acetate=1)	:	No data available
Flammability	:	No data available
Vapor pressure	:	No data available
Relative vapor density at 20°C	:	No data available
Relative density	:	No data available
Solubility	:	Insoluble.
Partition coefficient n-octanol/water (Log Pow)	:	No data available
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	No data available
Explosion limits	:	No data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport. Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapors.

10.2. Chemical stability

Stable under normal conditions of use.

10.3. Possibility of hazardous reactions

In contact with water releases flammable gas.

10.4. Conditions to avoid

Direct sunlight. High temperature. Heat and ignition sources. Moisture. Do not allow contact with water. Do not freeze.

10.5. Incompatible materials

Strong oxidizing agents. Strong acids. Strong bases. Water.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

Cobalt lithium manganese nickel oxide (182442-95-1)	
ATE US (gases)	100 ppmV/4h
ATE US (vapors)	0.5 mg/l/4h
ATE US (dust, mist)	0.05 mg/l/4h

Lithium hexafluorophosphate(1-) (21324-40-3)	
LD50 oral rat	50 – 300 mg/kg
ATE US (oral)	100 mg/kg body weight

Ethylene carbonate (96-49-1)	
ATE US (oral)	500 mg/kg body weight

Lithium manganese oxide (LiMn2O4) (12057-17-9)	
ATE US (oral)	500 mg/kg body weight
ATE US (gases)	4500 ppmV/4h
ATE US (vapors)	11 mg/l/4h
ATE US (dust, mist)	1.5 mg/l/4h

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

STOT-repeated exposure : Not classified

Cobalt lithium manganese nickel oxide (182442-95-1)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Lithium hexafluorophosphate(1-) (21324-40-3)	
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Ethylene carbonate (96-49-1)	
STOT-repeated exposure	May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard : Not classified

Viscosity, kinematic : No data available

Symptoms/effects : Risk of exposure only occurs if the battery cell is mechanically, thermally, or electrically abused and the enclosure is compromised. If this occurs, exposure to electrolyte solutions contained in the battery cell may occur by inhalation, eye contact, skin contact, or ingestion.

Symptoms/effects after inhalation : Vapors or mists from a ruptured battery may cause respiratory irritation. Danger of serious damage to health by prolonged exposure through inhalation. Fatal if inhaled.

Symptoms/effects after skin contact : Skin contact with a ruptured battery can cause skin irritation. Redness. Itching. Swelling.

Symptoms/effects after eye contact : Eye contact with the contents of a ruptured battery can cause severe irritation to the eye. Redness. Lacrimation. Itching. Blurred vision.

Symptoms/effects after ingestion : Harmful if swallowed. May cause gastrointestinal irritation, nausea, vomiting and diarrhea. Abdominal pain. Swallowing this material will result in serious health hazard, potentially leading to collapse and death.

Chronic symptoms : May cause cancer. Causes damage to organs through prolonged or repeated exposure.

Other information : No experimental study on the product is available. The information given is based on our knowledge of the components and the classification of the product is determined by calculation.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Do not allow product to spread into the environment. Harmful to aquatic life with long lasting effects.

12.2. Persistence and degradability

Lithium-ion Cell	
Persistence and degradability	Biodegradability in water: no data available.

12.3. Bioaccumulative potential

Lithium-ion Cell	
Bioaccumulative potential	No data available concerning bioaccumulation.

12.4. Mobility in soil

Lithium-ion Cell	
Ecology - soil	No additional information available.

12.5. Other adverse effects

Other adverse effects : No other effects known.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods	:	Dispose of contents/container in accordance with licensed collector's sorting instructions.
Sewage disposal recommendations	:	Do not dispose of waste into sewer.
Product/Packaging disposal recommendations	:	Must not be disposed together with household garbage. Dispose in a safe manner in accordance with local/national regulations. To be disposed of as hazardous waste. Do not disassemble, short circuit, puncture, incinerate, crush, or puncture the battery. Do not mix new and used batteries.
Ecological information	:	Avoid release to the environment. Hazardous waste due to toxicity.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

14.1. UN number

DOT NA No	:	UN3480
UN-No. (TDG)	:	UN3480
UN-No. (IMDG)	:	3480
UN-No. (IATA)	:	3480

14.2. UN proper shipping name

Proper Shipping Name (DOT)	:	Lithium ion batteries
Proper Shipping Name (TDG)	:	LITHIUM ION BATTERIES
Proper Shipping Name (IMDG)	:	LITHIUM ION BATTERIES
Proper Shipping Name (IATA)	:	Lithium ion batteries

14.3. Transport hazard class(es)

DOT

Transport hazard class(es) (DOT) : 9

Hazard labels (DOT) : 9

TDG

Transport hazard class(es) (TDG) : 9

Hazard labels (TDG) : 9

IMDG

Transport hazard class(es) (IMDG) : 9

Hazard labels (IMDG) : 9A

IATA

Transport hazard class(es) (IATA) : 9

Hazard labels (IATA) : 9A

14.4. Packing group

Packing group (DOT) : Not applicable
Packing group (TDG) : Not applicable
Packing group (IMDG) : Not applicable
Packing group (IATA) : Not applicable

14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Special precautions for user

DOT

UN-No.(DOT) : UN3480

DOT Special Provisions (49 CFR 172.102) : 388 - a. Lithium batteries containing both primary lithium metal cells and rechargeable lithium ion cells that are not designed to be externally charged, must meet the following conditions: i. The rechargeable lithium ion cells can only be charged from the primary lithium metal cells; ii. Overcharge of the rechargeable lithium ion cells is precluded by design; iii. The battery has been tested as a primary lithium battery; and iv. Component cells of the battery must be of a type proved to meet the respective testing requirements of the Manual of Tests and Criteria, part III, subsection 38.3 (IBR, see 171.7 of this subchapter). b. Lithium batteries conforming to paragraph a. of this special provision must be assigned to UN Nos. 3090 or 3091, as appropriate. When such batteries are transported in accordance with 173.185(c), the total lithium content of all lithium metal cells contained in the battery must not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery must not exceed 10 Wh.
422 - When labelling is required, the label to be used must be the label shown in §172.447. Labels conforming to requirements in place on December 31, 2016 may continue to be used until December 31, 2018. When a placard is displayed, the placard must be the placard shown in §172.560.
A54 - Lithium batteries or lithium batteries contained or packed with equipment that exceed the maximum gross weight allowed by Column (9B) of the 172.101 Table may only be transported on cargo aircraft if approved by the Associate Administrator.
A100 - Primary (non-rechargeable) lithium batteries and cells are forbidden for transport aboard passenger carrying aircraft. Secondary (rechargeable) lithium batteries and cells are authorized aboard passenger carrying aircraft in packages that do not exceed a gross weight of 5 kg.

DOT Packaging Exceptions (49 CFR 173.xxx) : 185
DOT Packaging Non Bulk (49 CFR 173.xxx) : 185
DOT Packaging Bulk (49 CFR 173.xxx) : 185
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 35 kg
DOT Vessel Stowage Location : A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.

TDG

UN-No. (TDG) : UN3480

TDG Special Provisions : 34 - (1) These Regulations, except for Part 1 (Coming into Force, Repeal, Interpretation, General Provisions and Special Cases) and Part 2 (Classification), do not apply to the handling, offering for transport or transporting of lithium cells and batteries on a road vehicle, a railway vehicle or a vessel on a domestic voyage if

TDG Special Provisions	:	(a) for a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and, for a lithium-ion cell, the watt-hour rating is not more than 20 Wh; (b) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the watt-hour rating is not more than 100 Wh; (c) lithium ion batteries are marked with the watt-hour rating on the outside case, except for those manufactured before January 1, 2009; (d) each cell and battery type passes each of the tests set out in paragraph 2.43.1(2)(a) of Part 2 (Classification); (e) the cells and batteries are afforded protection against short circuit, including protection against contact with conductive materials within the same packaging that could lead to a short circuit; (f) the cells and batteries are packed in a means of containment that completely encloses the cells and batteries; (g) the gross mass of the cells and batteries does not exceed 30 kg, except when the cells and batteries are installed in or packed with equipment; and (h) the cells and batteries are packed in a means of containment capable of withstanding a 1.2 m drop test in any orientation without damage to the cells or batteries contained inside the means of containment, without the contents shifting so as to allow battery-to-battery or cell-to-cell, contact, and without release of contents. (2) Cells and batteries referred to in subsection (1) that are installed in equipment must, unless they are afforded equivalent protection by the equipment in which they are contained, (a) be afforded protection against damage and short circuit, including protection against contact with conductive materials within the same packaging that could lead to a short circuit; (b) subject to subsection (3), be fitted to prevent accidental activation; and (c) be packed in a means of containment designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no release of the dangerous goods that could endanger public safety. (3) Paragraph (2)(b) does not apply to cells and batteries installed in devices that are intentionally active during transport such as radio frequency identification transmitters, watches and sensors, and that are not capable of generating a dangerous evolution of heat. (4) Except for means of containment containing button cell batteries installed in equipment, including circuit boards, or no more than four cells installed in equipment or no more than two batteries installed in equipment, each means of containment must be marked with the appropriate lithium battery mark in accordance with section 4.24. (5) Despite subsection (4), except for means of containment containing button cell batteries installed in equipment, including circuit boards, or no more than four cells installed in equipment or no more than two batteries installed in equipment, each means of containment may, until December 31, 2018, be marked with the following: (a) “lithium metal”, “lithium métal”, “lithium ion” or “lithium ionique”, as appropriate; (b) an indication that the means of containment must be handled with care and that a flammability hazard exists if the means of containment is damaged; (c) an indication that special procedures must be followed in the event the means of containment is damaged, including inspection and repacking, if necessary; and (d) a telephone number to call for additional information,123 - (1) The testing requirements in subsection 38.3 of Part III of the Manual of Tests and Criteria do not apply to production runs consisting of not more than 100 cells and batteries or to pre-production prototypes of cells and batteries that are transported on a road vehicle, a railway vehicle or a vessel on a domestic voyage if (a) the cells or batteries are imported, offered for transport, handled or transported in accordance with Packing Instruction P910 of the UN Recommendations; and (b) the pre-production prototypes of cells and batteries are in transport for the purpose of testing. (2) Despite paragraph (1)(b), batteries that have a total mass of 12 kg or more and that have a strong, impact-resistant outer casing, or assemblies of them, may be packed in an outer means of containment or protective enclosure designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no release of the dangerous goods that could endanger public safety. The batteries or battery assemblies must be protected from short-circuit,137 - (1) This shipping name applies to lithium ion cells or batteries, and lithium metal cells or batteries, that are damaged or defective and do

not conform to subsection 2.43.1(2) of Part 2 (Classification).
(2) Lithium ion cells or batteries and lithium metal cells or batteries that are damaged or defective, include, but are not limited to, cells or batteries that have leaked or vented, or have sustained physical or mechanical damage, and cannot be diagnosed prior to transport, or that have been identified as being defective for safety reasons.
(3) Lithium ion cells or batteries and lithium metal cells or batteries that are damaged or defective must be packed in accordance with Packing Instructions P908 or LP904 of the UN Recommendations, as applicable.
(4) As applicable, the outer means of containment or the overpack must be marked legibly and visibly on a contrasting background, with the words “Damaged/Defective Lithium Ion Batteries”, “piles au lithium ionique endommagées/défectueuses”, “Damaged/Defective Lithium Metal Batteries” or “piles au lithium métal endommagées/défectueuses”.
(5) It is forbidden to transport lithium ion cells or batteries and lithium metal cells or batteries that are damaged or defective and that, under normal conditions of transport, are liable to disassemble rapidly, react dangerously, produce a flame or a dangerous evolution of heat, or produce a dangerous emission of toxic, corrosive or flammable gases or vapours.
(6) It is forbidden to transport by aircraft lithium ion cells or batteries and lithium metal cells or batteries that are damaged or defective,138 - (1) When transported for disposal or recycling, lithium ion cells or batteries and lithium metal cells or batteries, or equipment containing those cells or batteries,
(a) are not subject to subsection 2.43.1(2) of Part 2 (Classification);
(b) must be packed in accordance with Packing Instructions P909 or LP904 of the UN Recommendations, as applicable, whether packed with or without non-lithium cells or batteries or equipment containing those cells or batteries;
(c) must be in a means of containment or an overpack that is marked legibly and visibly on a contrasting background with the words “Lithium batteries for disposal”, “Piles au lithium destinées à l’élimination”, “Lithium batteries for recycling” or “Piles au lithium destinées au recyclage”, as appropriate; and
(d) are forbidden for transport by aircraft.
(2) Damaged or defective cells and batteries must be offered for transport or transported under special provision 137,149 - These dangerous goods are forbidden for transport as cargo on a passenger aircraft,159 - (1) Subject to subsection (2), the label to be used for these dangerous goods is the one illustrated under the heading for lithium batteries “Class 9, Lithium Batteries” in the appendix to Part 4 (Dangerous Goods Safety Marks).
(2) The generic Class 9 label may be used until December 31, 2018.

Explosive Limit and Limited Quantity Index	:	0
Excepted quantities (TDG)	:	E0
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	:	5 kg
Emergency Response Guide (ERG) Number	:	147

IMDG

Special provision (IMDG)	:	188, 230, 310, 348, 376, 377, 384, 387
Limited quantities (IMDG)	:	0
Excepted quantities (IMDG)	:	E0
Packing instructions (IMDG)	:	P903, P908, P909 , P910, P911, LP903, LP904, LP905, LP906
EmS-No. (Fire)	:	F-A - FIRE SCHEDULE Alfa - GENERAL FIRE SCHEDULE
EmS-No. (Spillage)	:	S-I - SPILLAGE SCHEDULE India - FLAMMABLE SOLIDS (REPACKING POSSIBLE)
Stowage category (IMDG)	:	A
Properties and observations (IMDG)	:	Electrical batteries containing lithium ion encased in a rigid metallic body. Lithium ion batteries may also be shipped in, or packed with, equipment. Electrical lithium batteries may cause fire due to an explosive rupture of the body caused by improper construction or reaction with contaminants.

IATA

PCA Excepted quantities (IATA)	:	E0
PCA Limited quantities (IATA)	:	Forbidden
PCA limited quantity max net quantity (IATA)	:	Forbidden

PCA packing instructions (IATA)	:	Forbidden
PCA max net quantity (IATA)	:	Forbidden
CAO packing instructions (IATA)	:	See 965
CAO max net quantity (IATA)	:	See 965
Special provision (IATA)	:	A88, A99, A154, A164, A183, A201, A213, A331, A334, A802
ERG code (IATA)	:	12FZ

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory		
Cobalt lithium manganese nickel oxide	CAS-No. 182442-95-1	≥ 10 – < 15%
Graphite	CAS-No. 7782-42-5	≥ 15 – < 20%
Lithium hexafluorophosphate(1-)	CAS-No. 21324-40-3	≥ 1 – < 2.5%
Copper	CAS-No. 7440-50-8	≥ 2.5 – < 5%
Aluminium	CAS-No. 7429-90-5	≥ 2.5 – < 5%
Ethylene carbonate	CAS-No. 96-49-1	≥ 2.5 – < 5%
Lithium manganese oxide (LiMn2O4)	CAS-No. 12057-17-9	≥ 25 – < 40%
Contains chemical(s) subject to TSCA 12b export notification if product is shipped outside the U.S		
Cobalt lithium manganese nickel oxide	CAS-No. 182442-95-1	≥ 10 – < 15%
Lithium manganese oxide (LiMn2O4)	CAS-No. 12057-17-9	≥ 25 – < 40%

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.		
Copper	CAS-No. 7440-50-8	≥ 2.5 – < 5%
Aluminium	CAS-No. 7429-90-5	≥ 2.5 – < 5%

Cobalt lithium manganese nickel oxide (182442-95-1)	
EPA TSCA Regulatory Flag	PMN - PMN - indicates a commenced PMN substance. S - S - indicates a substance that is identified in a final Significant New Use Rule. 5E - 5E - indicates a substance that is the subject of a TSCA section 5E order.

Lithium hexafluorophosphate(1-) (21324-40-3)	
EPA TSCA Regulatory Flag	PMN - PMN - indicates a commenced PMN substance.

Copper (7440-50-8)	
CERCLA RQ	5000 lb

Lithium manganese oxide (LiMn2O4) (12057-17-9)	
EPA TSCA Regulatory Flag	PMN - PMN - indicates a commenced PMN substance. S - S - indicates a substance that is identified in a final Significant New Use Rule. 5E - 5E - indicates a substance that is the subject of a TSCA section 5E order.

15.2. International regulations

CANADA

Cobalt lithium manganese nickel oxide (182442-95-1)
Listed on the Canadian DSL (Domestic Substances List)

Graphite (7782-42-5)
Listed on the Canadian DSL (Domestic Substances List)

Lithium hexafluorophosphate(1-) (21324-40-3)
Listed on the Canadian NDSL (Non-Domestic Substances List)

Copper (7440-50-8)
Listed on the Canadian DSL (Domestic Substances List)

Aluminium (7429-90-5)
Listed on the Canadian DSL (Domestic Substances List)

Ethylene carbonate (96-49-1)
Listed on the Canadian DSL (Domestic Substances List)

Lithium manganese oxide ($LiMn_2O_4$) (12057-17-9)
Not listed on the Canadian DSL (Domestic Substances List)/NDSL (Non-Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Lithium-ion Cell
Not listed on the United States TSCA (Toxic Substances Control Act) inventory

Cobalt lithium manganese nickel oxide (182442-95-1)
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active

Graphite (7782-42-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Listed on INSQ (Mexican National Inventory of Chemical Substances)

Lithium hexafluorophosphate(1-) (21324-40-3)
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active

Copper (7440-50-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Listed on INSQ (Mexican National Inventory of Chemical Substances)

Aluminium (7429-90-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active Listed on INSQ (Mexican National Inventory of Chemical Substances)

Ethylene carbonate (96-49-1)
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active

Lithium manganese oxide (LiMn2O4) (12057-17-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Data sources : Supplier's safety documents.

Training advice : Training staff on good practice.

Full text of H-phrases	
H228	Flammable solid
H261	In contact with water releases flammable gas
H301	Toxic if swallowed
H302	Harmful if swallowed
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H319	Causes serious eye irritation
H330	Fatal if inhaled
H332	Harmful if inhaled
H350	May cause cancer
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H411	Toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects
H413	May cause long lasting harmful effects to aquatic life

Safety Data Sheet (SDS), USA

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.