

**1. IDENTIFICATION**

**Product Identifier used on the label:**

Lithium Ion Battery (Module)

**Chemical Family/Classification:**

Rechargeable Battery (Module)

**Other Means of Identification:**

Industrial Battery

**Recommended Use and Restrictions on Use:**

For use as a rechargeable battery (module); this product contains a SNUR substance, see Section 15.

**Manufacturer's Name/Address:**

EnerSys  
P.O. Box 14145  
2366 Bernville Road  
Reading, PA 19605

Canada Corporate Office  
3-61 Parr Boulevard  
Bolton, Ontario  
L7E 4E3

**Telephone:**

For information and emergencies, contact EnerSys'  
Environmental, Health & Safety Dept. at 610-208-1996

**24-Hour Emergency Response Contact:**

CHEMTREC DOMESTIC: 800-424-9300 CHEMTREC INT'L: 703-527-3877

**2. HAZARD IDENTIFICATION**

**Hazard Classifications:**

HEALTH		ENVIRONMENTAL		PHYSICAL	
Skin Corrosion	Category 1	Aquatic Chronic Toxicity	Category 2	Flammable Liquid	Category 2
STOT RE	Category 1				

**Hazard Symbols:**

HEALTH	ENVIRONMENTAL	PHYSICAL

**Signal Word: DANGER!**

**Hazard Statements**

Causes severe skin burns and eye damage.  
Causes damage to organs (teeth, bones) through prolonged or repeated exposure  
Highly flammable liquid and vapor.  
Toxic to aquatic life.

**Precautionary Statements**

**Prevention**

Do not breathe dusts/fume/gas/mist/vapors/spray.  
Wash exposed skin thoroughly after handling.  
Wear protective gloves/protective clothing/eye protection/face protection.  
Do not eat, drink, or smoke when using this product.  
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
Keep container tightly closed.  
Ground/bond container and receiving equipment.  
Use explosion-proof electrical/ventilating/lighting/equipment.  
Use only non-sparking tools.  
Take precautionary measures against static discharge.  
Avoid release to the environment.

**Hazards Not Otherwise Classified:** None Identified.

**Precautionary Statements (continued)**

**Response**

If swallowed: Rinse mouth. Do NOT induce vomiting.  
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.  
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.  
If inhaled: Remove person to fresh air and keep comfortable for breathing.  
Immediately call a poison center or doctor.  
Specific treatment: See Section 4.  
Get medical attention if you feel unwell.  
In case of fire: Use water spray, foam, CO2 or dry chemical fire extinguishers  
Continue cooling with excessive water.

**Storage**

Store locked up in a well-ventilated place. Keep dry, cool and protect from sunlight

**Disposal**

Dispose of contents in accordance with local/regional/national/international regulations.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Approximate % by Weight
Graphite	7782-42-5	7-25
Cobalt lithium manganese nickel oxide	182442-95-1	5-40
1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene	9011-17-0	3-15
Lithium hexafluorophosphate	21324-40-3	0-5
Carbon black	1333-86-4	0-2
Diethyl carbonate	105-58-8	0-15
Dimethyl carbonate	616-38-6	0-15
Ethyl methyl carbonate	623-53-0	0-15
Propylene carbonate	108-32-7	0-15
Ethylene carbonate	96-49-1	0-15

### 4. FIRST AID MEASURES

**Inhalation:**

Provide fresh air and seek medical attention. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Ingestion:**

Seek medical attention immediately. Do not induce vomiting or give food or drink.

**Skin:**

Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

**Eyes:**

Flush immediately with large amounts of water for at least 15 minutes while lifting lids until no evidence of the chemical remains. Seek medical attention.

**Most important symptoms/effects, acute and delayed:**

Battery (module) internal components can cause chemical burns to skin and eyes and prolonged or repeated exposure to fluorides (e.g., hexafluorophosphate) can cause fluorosis of bones and

**Immediate medical attention and special treatment needed:**

Seek immediate attention if internal components come into contact with skin, eyes, or are ingested. If ingested, treatment to prevent fluorosis may be required.

### 5. FIRE FIGHTING MEASURES

**First responders:**

Wear self-contained breathing apparatus and protective suit.

**Special protective equipment and precautions for fire-fighters:**

Wear self-contained breathing apparatus, protective clothing, gloves, face and eye protection

**Suitable extinguishing media in this order: excess of water spray, dry chemical, CO2 or foam.**

The cooling effect of water effectively impedes fire from spreading to battery cells which still have not reached the critical ignition temperature (thermal runaway)

**Specific hazards arising from the chemical:**

Burning battery (module) and batteries may produce highly toxic carbon monoxide, suffocating carbon dioxide and toxic corrosive hydrogen fluoride gas.

Fumes may cause dizziness or suffocation.

**Unusual fire and explosion hazards:**

Do not allow metallic materials to simultaneously contact negative and positive terminals of battery (module) as this may cause a short circuit and generate heat which may start a fire. Follow manufacturer's instructions for installation and service. Explosion hazard in well sealed containers, keep in a well ventilated area.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment, and emergency procedures:**

Wear protective clothing, boots, gloves, and face shield. Ensure adequate ventilation.

**Methods and materials for containment and cleaning up:**

Place material into suitable containers and call the local fire/police department.

### 7. HANDLING AND STORAGE

**Precautions for safe handling:**

Wear protective clothing, eye and face protection when charging or handling of batteries (module). Do not touch eyes, nose, or mouth. Do not allow metallic materials to simultaneously contact positive and negative terminals of battery (module). Packaged batteries (modules) must be separated in a way to prevent short circuits or damage to terminals.

Keep battery (module) away from incompatible materials (see Section 10). Use banding or stretch wrap to secure items for shipping.

**Conditions for safe storage:**

Store battery (module) in cool, dry areas away from heat and incompatible materials (see Section 10). Cover the terminals with protective case when not in use. Avoid damage to containers.

Keep away from fire, sparks and heat. Avoid excessive physical shock or vibration.

Battery (module) should be stored at between 25% and 75% of full charge during long-term storage.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Exposure Limits:**

INGREDIENTS	OSHA PEL	ACGIH TLV	US NIOSH REL
Graphite	2.5 mg/m <sup>3</sup> (respirable)	2 mg/m <sup>3</sup> (respirable, natural, all forms except fibers)	2.5 mg/m <sup>3</sup>
Cobalt lithium manganese nickel oxide*	None	None	None
1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene			
Lithium hexafluorophosphate	None	None	None
Carbon black	3.5 mg/m <sup>3</sup>	3 mg/m <sup>3</sup> (IHL)	3.5 mg/m <sup>3</sup> (without PAHs); when PAHs
Diethyl carbonate	None	None	None
Dimethyl carbonate	None	None	None
Ethyl methyl carbonate	None	None	None
Propylene carbonate	None	None	None
Ethylene carbonate	None	None	None

\* The New Chemical Exposure Limit (NCEL) listed in the TSCA Section 5(e) consent order for this substance is 0.1 mg/m<sup>3</sup> as an 8-hour time-weighted average. However the requirements of the SNUR are not required after the substance has been completely reacted (cured), as is the case with this product.

**Appropriate engineering controls:**

Keep away from heat and open flame. Store and handle in well-ventilated area. If dust is generated, mechanical ventilation should be used. General dilution ventilation is acceptable.

**Individual protection measures, such as personal protective equipment:**

**Respiratory Protection:**

None required under normal handling and use. If dust is generated, use a full-face respirator with particle filter cartridge.

**Skin Protection:**

Wear gloves and other necessary clothing such as suit with long sleeves to prevent skin contact with plates or lead dust.

**Eye Protection:**

None required under normal handling and use. If handling an open or leaking battery (module), wear safety glasses with side shields.

**Other Protection:**

When operators handle the battery which voltage is more than 50 volts DC, they should review local regulations to ensure proper insulation is worn to protect against electrical shock.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance:</b>	Battery (module) product.
<b>Odor:</b>	None.
<b>Odor threshold:</b>	Not applicable.
<b>pH:</b>	Not applicable.
<b>Melting point/freezing point:</b>	Not applicable.
<b>Initial boiling point and boiling range:</b>	Not applicable.
<b>Flash point:</b>	Not applicable.
<b>Evaporation rate:</b>	Not applicable.
<b>Flammability (solid, gas):</b>	Contains flammable substances.
<b>Upper/lower flammability or explosive limits:</b>	Not applicable.
<b>Vapor pressure:</b>	Not applicable.
<b>Vapor density:</b>	Not available.
<b>Relative density:</b>	Not available.
<b>Solubility(ies):</b>	Not applicable.
<b>Partition coefficient (n-octanol/water):</b>	Not available.
<b>Auto-ignition temperature:</b>	Not applicable.
<b>Decomposition temperature:</b>	Not available.
<b>Viscosity:</b>	Not available.

## 10. STABILITY AND REACTIVITY

### Reactivity:

Not considered reactive under normal conditions at ambient temperature.

### Chemical stability:

This product is stable under normal conditions at standard temperature.

### Possibility of hazardous reactions:

Violent reaction may occur in contact with hot, concentrated acid, strong oxidizers, and water.

### Conditions to avoid:

Avoid heat, sources of ignition, and contact with strong acids, strong oxidizers, and corrosive material.

### Incompatible materials:

Combustible materials, organic chemicals, strong acids (such as nitric, hydrochloric, or sulfuric acids), reducing substances, strong oxidizers (such as perchlorates, peroxides, permanganates, chlorates, and nitrates), and chemically active metals (such as potassium, sodium, magnesium, and zinc). If aluminum foil packaging is damaged, avoid contact with water or acid because these may damage the battery (module) or cause a short circuit. If the aluminum foil packaging is damaged, strong oxidizers, acids and high temperatures may cause hydrogen fluoride gas to be formed.

### Hazardous decomposition products:

Not available.

### Hazardous polymerization:

Will not occur.

## 11. TOXICOLOGICAL INFORMATION

### Information on the likely routes of exposure:

#### Inhalation:

Not expected under normal handling and use. Inhalation may occur if fumes are generated upon heating. Inhalation of fumes may cause irritation of the upper respiratory tract and lungs.

#### Ingestion:

Not expected under normal handling and use. Ingestion may occur if mouth is touched prior to washing hands. Ingestion can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

#### Skin Contact:

Not expected under normal handling and use. Ethylene carbonate, diethyl carbonate and dimethyl carbonate may be absorbed through the skin causing localized inflammation.

#### Eye Contact:

Not expected under normal handling and use. Contact with eyes may cause irritation and chemical burns.

**Symptoms related to the physical, chemical and toxicological characteristics:**

Effects of overexposure - acute:

battery (module) internal components can cause chemical burns to skin and eyes.

Effects of overexposure - chronic:

Repeated exposure to battery (module) internal component (hexafluorophosphate) can cause fluorosis of bones and teeth.

**Delayed and immediate effects and also chronic effects from short- and long-term exposure:**

Repeated exposure to battery (module) internal component (hexafluorophosphate) can cause fluorosis of bones and teeth.

**Numerical measures of toxicity:**

Acute Oral toxicity:

Oral LD50 (graphite): > 2000 mg/kg

Oral LD50 (lithium hexafluorophosphate): 200 mg/kg

Oral LD50 (carbon black): > 8000 mg/kg

Oral LD50 (diethyl carbonate): 4876 mg/kg

Oral LD50 (dimethyl carbonate): 5000 mg/kg

Oral LD50 (ethyl methyl carbonate): 5000 mg/kg

Oral LD50 (propylene carbonate): 5000 mg/kg

Oral LD50 (ethylene carbonate): 10400 mg/kg

Acute dermal toxicity:

Dermal LD50 (dimethyl carbonate): >2500 mg/kg body weight

**Carcinogenicity:**

Carbon black is listed as a Group 2B carcinogen by IARC, and cobalt compounds are listed as Group 2B. Per the guidance found in OSHA 29 CFR 1910.1200 Appendix F, this is approximately equivalent to GHS Category 2. Carbon black is not identified as a carcinogen by OSHA and is not listed by the 14th Report on Carcinogens by the NTP. Cobalt and cobalt compounds that release cobalt ions in vivo are listed on the 14th Report on Carcinogens by the NTP.

**Reproductive Toxicity:**

No components of this product are known to be reproductive toxins.

**Medical Conditions Generally Aggravated by Exposure:**

None known.

**Additional Health Data:**

All heavy metals, including the hazardous ingredients in this product, are taken into the body primarily by inhalation and ingestion. Most inhalation problems can be avoided by adequate precautions such as ventilation and respiratory protection covered in Section 8. Follow good personal hygiene to avoid inhalation and ingestion: wash hands, face, neck and arms thoroughly before eating, smoking or leaving the worksite. Keep contaminated clothing out of non-contaminated areas, or wear cover clothing when in such areas. Restrict the use and presence of food, tobacco and cosmetics to non-contaminated areas. Work clothes and work equipment used in contaminated areas must remain in designated areas and never taken home or laundered with personal non-contaminated clothing. This product is intended for industrial use only and should be isolated from children and their environment.

**12. ECOLOGICAL INFORMATION**

**Eco toxicity:**

No data on Eco toxicity.

**Persistence and degradability:**

No data on environmental degradation.

**Bio accumulative potential:**

No data on bio accumulative potential.

**Mobility in soil:**

No data on mobility in soil.

**Other adverse effects:**

- No known effects on stratospheric ozone depletion.
- Water Endangering Class (WGK): NA

**13. DISPOSAL CONSIDERATIONS (UNITED STATES)**

Recycle and dispose of material waste to an approved waste disposal facility in accordance with local, state, and federal requirements. Do not release to sewer or waterways. Following local, State/Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end-user.

**14. TRANSPORT INFORMATION**

**U.S. DOT:**

Proper shipping name: Lithium ion batteries

UN number: UN3480

Hazard Class: 9

Packing group: N/A

Note: Although not assigned a packing group, packaging material for lithium batteries (modules) must meet packaging requirements outlined in 49 CFR 173.185(b).

**IATA: Not Applicable**

**IMDG:**

Proper shipping name: Lithium ion batteries

UN number: UN3480

Hazard Class: 9

Packing group: N/A

Note: Lithium ion batteries (modules) must meet specific packing requirements according to IMDG Packing Instruction P903.

**Environmental hazards:**

Lithium-ion batteries (modules) contents are hazardous to the aquatic environment.

**Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code):**

Not applicable.

**Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises:**

No special precautions in connection with transport or conveyance.

**15. REGULATORY INFORMATION**

**UNITED STATES:**

**EPA SARA Title III:**

Section 302 EPCRA Extremely Hazardous Substances (EHS):

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302. For more information consult 40 CFR Part 355.

Section 313 EPCRA Toxic Substances:

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313

**TSCA:**

TSCA Section 8b – Inventory Status: All chemicals comprising this product are listed on the TSCA Inventory.

Cobalt lithium manganese nickel oxide is subject to a Section 5(a) Significant New Use Rule (SNUR) and Section 5(e) Consent Order (40CFR 721.10201). However the requirements of the SNUR are not required after the substance has been completely reacted (cured), as is the case with this product.

**16. OTHER INFORMATION**

Revised: 04/07/20

**USA**

SDS's are a subclause of the Hazard Communication Standard 29 CFR section 1910.1200 of the Occupational Safety and Health Administration (OSHA). This standard is not applicable on "articles" Li-Ion batteries are defined as "articles" they are exempted from the requirements of the Hazard Communication Standard.

**EC**

These batteries are neither "compounds" nor "blends" according to REACH regulation (EC) 1907/2006. Instead of this they have to be regarded as products. An intended release of compounds is not planned. Therefore there is no obligation to provide a Safety Data Sheet according to article 31 of the REACH regulation.

**Additional Safety:**

Modules may only be operated with the designated battery.

Use only by EnerSys approved chargers.

Do not short circuit or deep discharge.

Do not damage or perforate.

Do not tear down.

Do not heat above the allowed limits. (see instructions of use)

Cells in Lithium-Ion batteries are sealed and are not hazardous as long as use of all manufacturer's instructions are applied.

Violation of manufacturer's instructions may lead to a release of ingredients of cells.

In case of damage to the cell, corrosive and poisonous liquid can be released.

In case of fire, corrosive and poisonous vapors and gases may be released.

**DISCLAIMER**

This Product Safety Data Sheet is created by the manufacturer according to the OSHA standard of 29 CFR 1910.1200. To the extent allowed by law, the manufacturer hereby expressly disclaims any liability to any third party, including users of this product, including, but not limited to, consequential or other damages, arising out of the use of, or reliance on, this Product Safety Data Sheet.