

Product Name: **Premium Bar & Chain Oil**  
Revision Date: 23 Nov 2018  
Issue Date: 8 Aug 2016

SDS Number:2011740XCN  
Version:2.02

## SAFETY DATA SHEET

### SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

#### PRODUCT

**Product Name:** Premium Bar & Chain Oil  
**Product Description:** White Mineral Oil  
**Product Code:** 2010B0201085, 750364-60  
**Recommended Use:** Cosmetic, Lubricant, Pharmaceutical, Plastics, Rubber applications,  
subject to applicable laws and regulations

#### COMPANY IDENTIFICATION

**Supplier:** ExxonMobil (China) Investment Co., Ltd.  
17/F., Metro Tower  
30 Tian Yao Qiao Road  
Shanghai 200030 China

<b>24 Hour Emergency Telephone</b>	(+86) 0532-83889090
<b>Supplier General Contact</b>	(+86) 021-24076000
<b>E-Mail</b>	lubricants-sds@exxonmobil.com
<b>FAX</b>	400 1200 526

### SECTION 2 HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW:

**Physical State:** Liquid **Colour:** Colourless **Odour:** Odourless

H304: May be fatal if swallowed and enters airways.

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

The hazard classification for this material is in accordance with the General Rules for Classification and Hazard Communication of Chemicals (GB 13690-2009).

#### CLASSIFICATION:

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Aspiration toxicant: Category 1.

**LABEL:**

Symbol:



**Signal Word:** Danger

**Hazard Statements:**

Health: H304: May be fatal if swallowed and enters airways.

**Precautionary Statements:**

Response: P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P331: Do NOT induce vomiting.

Storage: P405: Store locked up.

Disposal: P501: Dispose of contents and container in accordance with local regulations.

**Contains:** WHITE MINERAL OIL (PETROLEUM)

**Other hazard information:**

**PHYSICAL / CHEMICAL HAZARDS**

No significant hazards.

**HEALTH HAZARDS**

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

**ENVIRONMENTAL HAZARDS**

No significant hazards.

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS**

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This material is defined as a complex substance.

**Hazardous Substance(s) or Complex Substance(s) required for disclosure**

Name	CAS#	Concentration*	GHS Hazard Codes
WHITE MINERAL OIL (PETROLEUM)	8042-47-5	100 %	H304

\* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

**SECTION 4 FIRST AID MEASURES****FIRST AID:****INHALATION**

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

**SKIN CONTACT**

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

**EYE CONTACT**

Flush thoroughly with water. If irritation occurs, get medical assistance.

**INGESTION**

Seek immediate medical attention. Do not induce vomiting.

**IMPORTANT SYMPTOMS AND HEALTH EFFECTS**

Local necrosis as evidenced by delayed onset of pain and tissue damage a few hours after injection.

**ADVICE TO PROTECT RESCUER**

Please refer to Section 8 for personal protection information.

**NOTE TO PHYSICIAN**

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

**SECTION 5 FIRE FIGHTING MEASURES**

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## EXTINGUISHING MEDIA

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO<sub>2</sub>) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight streams of water

## SPECIAL HAZARD WHEN ON FIRE

In case of fire, see below for hazardous combustion products. Containers exposed to excessive heat from a fire may rupture.

## FIRE FIGHTING INSTRUCTIONS AND PROTECTIVE MEASURES

### FIRE FIGHTING

**Fire Fighting Instructions:** Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Smoke, Fume

## FLAMMABILITY PROPERTIES

**Flash Point [Method]:** >182 C (360 F) [ ASTM D-92]

**Flammable Limits (Approximate volume % in air):** LEL: 0.9 UEL: 7.0

**Autoignition Temperature:** N/D

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

### PROTECTIVE MEASURES

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or

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contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

## ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

## SPILL MANAGEMENT

**Land Spill:** Stop leak if you can do so without risk. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do so without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

## SECTION 7 HANDLING AND STORAGE

### HANDLING

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

### STORAGE

The type of container used to store the material may affect static accumulation and dissipation. Do not store in open or unlabelled containers.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMIT VALUES

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**Exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit/Standard			Note	Source	Year
WHITE MINERAL OIL (PETROLEUM)	Inhalable fraction	TWA	5 mg/m <sup>3</sup>			ACGIH	2018

**Exposure limits/standards for materials that can be formed when handling this product:** When mists / aerosols can occur, the following are recommended: 5 mg/m<sup>3</sup> - ACGIH TLV (inhalable fraction).

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

**ENGINEERING CONTROLS**

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

**PERSONAL PROTECTION**

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.  
Organic vapour

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use. Nitrile, Viton

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**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:  
No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

**Specific Hygiene Measures:** 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. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

## ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

### GENERAL INFORMATION

Physical State: Liquid  
Colour: Colourless  
Odour: Odourless  
Odour Threshold: N/D

### IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.85 [ASTM D4052]  
Flash Point [Method]: >182 C (360 F) [ASTM D-92]  
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0  
Flammability (Solid, Gas): N/A  
Autoignition Temperature: N/D  
Boiling Point / Range: N/D  
Vapour Density (Air = 1): > 2 at 101 kPa [Estimated]  
Vapour Pressure: < 0.013 kPa (0.1 mm Hg) at 20 ° C [Estimated]  
Evaporation Rate (n-butyl acetate = 1): N/D  
pH: N/A  
Log Pow (n-Octanol/Water Partition Coefficient): > 3.5 [Estimated]  
Solubility in Water: Negligible  
Viscosity: 14.5 cSt (14.5 mm<sup>2</sup>/sec) at 40 C - 17.5 cSt (17.5 mm<sup>2</sup>/sec) at 40 C | 3.7 cSt (3.7

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mm<sup>2</sup>/sec) at 100 C [ASTM D 445]  
**Freezing Point:** N/D  
**Melting Point:** N/A  
**Decomposition Temperature:** N/D  
**Oxidizing Properties:** See Hazards Identification Section.

**OTHER INFORMATION**

**Pour Point:** -6 C (21 F) [ ASTM D97]  
**DMSO Extract (mineral oil only), IP-346:** < 3 %wt

**SECTION 10 STABILITY AND REACTIVITY**

**STABILITY:** Material is stable under normal conditions.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

**CONDITIONS TO AVOID:** Excessive heat. High energy sources of ignition.

**MATERIALS TO AVOID:** Strong oxidisers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**SECTION 11 TOXICOLOGICAL INFORMATION**

**INFORMATION ON TOXICOLOGICAL EFFECTS**

<u>Hazard Class</u>	<u>Conclusion / Remarks</u>
<b>Inhalation</b>	
Acute Toxicity: (Rat) 4 hour(s) LC50 > 5000 mg/m <sup>3</sup> (Aerosol)	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
<b>Ingestion</b>	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
<b>Skin</b>	
Acute Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 402
Skin Corrosion/Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
<b>Eye</b>	



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Serious Eye Damage/Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
<b>Sensitisation</b>	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
<b>Aspiration:</b> Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.
<b>Germ Cell Mutagenicity:</b> Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 473 474 476
<b>Carcinogenicity:</b> Data available.	Not expected to cause cancer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 453
<b>Reproductive Toxicity:</b> Data available.	Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 414 415 421
<b>Lactation:</b> No end point data for material.	Not expected to cause harm to breast-fed children.
<b>Specific Target Organ Toxicity (STOT)</b>	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure. Based on test data for structurally similar materials.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 408 410 411 412 453

## OTHER INFORMATION

### For the product itself:

Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

White mineral oil, low viscosity: Did not cause mutations In Vitro. High oral doses in certain strains of rats (F-344) resulted in microscopic inflammatory (microgranuloma) changes in the liver, spleen, and lymph nodes. Some evidence of liver damage was observed. These animals also had some accumulation of saturated mineral hydrocarbons in certain tissues. Similar effects were not observed to the same degree in other rodent strains or in other species.

## IARC Classification:

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The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1

2 = IARC 2A

3 = IARC 2B

<b>SECTION 12 ECOLOGICAL INFORMATION</b>
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The information given is based on data for the material, components of the material, or for similar materials, through the application of bridging principals.

**ECOTOXICITY**

Material -- Not expected to be harmful to aquatic organisms.

**PERSISTENCE AND DEGRADABILITY**

**Biodegradation:**

Material -- Expected to be inherently biodegradable

**BIOACCUMULATION POTENTIAL**

Material -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

**MOBILITY**

Material -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.  
 Material -- Low potential to migrate through soil.

**ECOLOGICAL DATA**

**Ecotoxicity**

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	ELO 100 mg/l: data for similar materials
Aquatic - Acute Toxicity	96 hour(s)	Fish	LLO 100 - 10000 mg/l: data for similar materials
Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	ELO 100 mg/l: data for similar materials
Aquatic - Chronic Toxicity	21 day(s)	Daphnia magna	NOELR 10 - 1000 mg/l: data for similar materials

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Aquatic - Chronic Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	NOELR 100 mg/l: data for similar materials
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**Persistence, Degradability and Bioaccumulation Potential**

Media	Test Type	Duration	Test Results
Water	Ready Biodegradability	28 day(s)	Percent Degraded < 60 : similar material

**SECTION 13 DISPOSAL CONSIDERATIONS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**NATIONAL CATALOGUE OF HAZARDOUS WASTES**  
 HW08 - Waste Mineral Oils

**DISPOSAL RECOMMENDATIONS**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

**SECTION 14 TRANSPORT INFORMATION**

**China List of Dangerous Goods (GB 12268 - 2012) :** Not Regulated for Land Transport

**INTERNATIONAL CLASSIFICATION FOR TRANSPORT**

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

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**AIR (IATA):** Not Regulated for Air Transport

## SECTION 15 REGULATORY INFORMATION

The hazard classification for this material is in accordance with the General Rules for Classification and Hazard Communication of Chemicals (GB 13690-2009).

### REGULATORY STATUS AND APPLICABLE LAWS AND REGULATIONS

**The General Rules for preparation of precautionary label for Chemicals (GB 15258-2009):**  
Regulated

**Law of the People's Republic of China on Prevention and Control of Environmental Pollution by Solid Waste:** See Disposal Considerations section.

**Listed or exempt from listing/notification on the following chemical inventories (May contain substance(s) subject to notification to the EPA Active TSCA inventory prior to import to USA):**  
AICS, DSL, ENCS, IECSC, ISHL, KECI, PICCS, TCSI, TSCA

## SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**

H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**

Layout Reformatted with SDS compilation requirements.

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Referring to GB/T 16483 and GB/T 17519

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DGN: 2011740XCN (1013195)  
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## Material Safety Data Sheet

### 1. Product and Company Identification

**Important Note:** As a solid, manufactured article, exposure to hazardous ingredients is not expected with normal use. This battery is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirement. The information contained in this Material Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

#### Commercial product name

INR18650-20R

#### Use of the substance/preparation

Lithium-Ion battery

#### Manufacturer

SAMSUNG SDI Co., LTD

#### Address

HQ: 428-5, Gongse-dong, Giheung-gu, Yongin-si, Gyeonggi-do, Korea

#### Company/undertaking identification

Emergency Contact(Chemtrec)

1-800-424-9300: US and Canada / 1-703-527-3887: International

#### **Further Information**

Battery-System: Lithium-Ion (Li-ion)

Nominal Voltage: 3.6 V

Rated Capacity: 1.95 Ah

Wh rating: 7.02 Wh

Anode (negative electrode): based on intercalation graphite

Cathode (positive electrode): based on lithiated metal oxide (Cobalt, Nickel, Manganese)

#### **Remark:**

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. SAMSUNG SDI Co., Ltd. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

### 2. Hazards Identification

#### **Route(s) of Entry**

There is no hazard when the measures for handling and storage are followed.

#### **Signs and Symptoms of Exposure**

In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

OSHA Hazard Communication: This material is not considered hazardous by the OSHA Hazard Communication Standard 29CFR 1910.1200.

Carcinogenicity (NTP): Not listed  
Carcinogenicity (IARC): Not listed  
Carcinogenicity (OSHA): Not listed

### Special hazards for human health and environment

There is no hazard when the measures for handling and storage are followed.

In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

### 3. Composition/information on ingredients

#### Hazardous components

CAS-No.	Chemical name	Quantity
1307-96-6	Cobalt oxide	< 30 %
1313-13-9	Manganese dioxide	< 30 %
1313-99-1	Nickel oxide	< 30 %
7440-44-0	Carbon	< 30 %
	Electrolyte (*)	< 20 %
24937-79-9	Polyvinylidene fluoride (PVdF)	< 10 %
7429-90-5	Aluminium foil	2 - 10 %
7440-50-8	Copper foil	2 - 10 %
	Aluminium and inert materials	5 - 10 %

Full text of each relevant R phrase can be found in heading 16.

#### Further Information

For information purposes:

(\*) Main ingredients: Lithium hexafluorophosphate, organic carbonates

Because of the cell structure the dangerous ingredients will not be available if used properly.

During charge process a lithium graphite intercalation phase is formed.

Mercury content: Hg < 0.1mg/kg

Cadmium content: Cd < 1mg/kg

Lead content: Pb < 10mg/kg

### 4. First Aid Measures

#### General information

The following first aid measures are required only in case of exposure to interior battery components after damage of the external battery casing.

Undamaged, closed cells do not represent a danger to the health.

#### After inhalation



Ensure of fresh air. Consult a physician.

**After contact with skin**

In case of contact with skin wash off immediately with plenty of water. Consult a physician.

**After contact with eyes**

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical treatment by eye specialist.

**After ingestion**

Drink plenty of water.  
Call a physician immediately.

**5. Fire Fighting Measures**

**Suitable extinguishing media**

Cold water and dry powder in large amount are applicable.  
Use metal fire extinction powder or dry sand if only few cells are involved.

**Special hazards arising from the chemical**

May form hydrofluoric acid if electrolyte comes into contact with water.  
In case of fire, the formation of the following flue gases cannot be excluded:  
Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide.

**Protective equipment and precautions for firefighters**

Wear self-contained breathing apparatus and protective suit.  
Additional information  
If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) can explode/vent. Cell is not flammable but internal organic material will burn if the cell is incinerated.

**6. Accidental Release Measures**

**Personal precautions**

Use personal protective clothing.  
Avoid contact with skin, eyes and clothing.  
Avoid breathing fume and gas.

**Environmental precautions**

Do not discharge into the drains/surface waters/groundwater.  
Methods for cleaning up/taking up  
Take up mechanically and send for disposal.

**7. Handling and Storage**

**Handling**

**Advice on safe handling**

Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble.  
Advice on protection against fire and explosion  
Keep away from open flames, hot surfaces and sources of ignition.





**Storage**

**Requirements for storage rooms and vessels**

Storage at room temperature (approx. 20°C) at approx. 20-60% of the nominal capacity (OCV approx. 3.6 - 3.9 V/cell).  
 Keep in closed original container.

**8. Exposure controls/personal protection Exposure limit values Exposure limits**

Ingredient	Risk Codes	Safety Description	Hazard	Exposure Controls/Personal Protection
Cobalt oxide	R22;R43; R50/53	S24;S37;S60;S61	Xn(Harmful) N (Dangerous for the environment)	0.1 mg/m <sup>3</sup> (TWA)
Manganese (VI) oxide	R20/22	S25	Xn(Harmful)	<b>Airborne Exposure Limits:</b> - OSHA Permissible Exposure Limit (PEL): 5 mg/m <sup>3</sup> Ceiling for manganese compounds as Mn - ACGIH Threshold Limit Value (TLV): 0.2 mg/m <sup>3</sup> (TWA) for manganese, elemental and inorganic compounds as Mn
Nickel oxide	R43,R49, R53	S45,S53,S61	T(Toxic)	<b>Airborne Exposure Limits:</b> For Nickel, Metal and Insoluble Compounds, as Ni: - OSHA Permissible Exposure Limits (PEL) - 1 mg/m <sup>3</sup> (TWA). For Nickel, Elemental / Metal: - ACGIH Threshold Limit Value (TLV) - 1.5 mg/m <sup>3</sup> (TWA), A5 - Not suspected as a human carcinogen. For Nickel, Insoluble Compounds, as Ni: - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m <sup>3</sup> (TWA), A1 - Confirmed human carcinogen
Carbon	R36/37/38, R36/37 R20, R10	S22;S24/25	F(Highly Flammable) Xn(Harmful) Xi(Irritant)	<b>Airborne Exposure Limits:</b> - OSHA Permissible Exposure Limits (PELs): activated carbon (graphite, synthetic): Total particulate = 15 mg/m <sup>3</sup>
Aluminium foil	R17,R15, R36/38, R10,R67, R65,R62, R51/53, R48/20, R38,R11,	S7/8,S43,S26,S62, S61, S36/37, S33,S29,S16,S9	F(Highly Flammable) Xn(Harmful) Xi(Irritant)	<b>Airborne Exposure Limits:</b> -OSHA Permissible Exposure Limit (PEL): 15 mg/m <sup>3</sup> (TWA) total dust and 5 mg/m <sup>3</sup> (TWA) repairable fraction for Aluminum metal as Al -ACGIH Threshold Limit Value (TLV): 10 mg/m <sup>3</sup> (TWA) Aluminum metal dusts



Copper foil	R11 R36 R37 R38	S5,S26,S16,S61, S36/37	F(Highly Flammable) N(Dangerous for the environment) Xn(Harmful) Xi(Irritant)	Copper Dust and Mists, as Cu: - OSHA Permissible Exposure Limit (PEL) - 1 mg/m3 (TWA) - ACGIH Threshold Limit Value (TLV) - 1 mg/m3 (TWA) Copper Fume: - OSHA Permissible Exposure Limit (PEL) - 0.1 mg/m3 (TWA) - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m3 (TWA)
Polyvinylidene fluoride (PVdF)		S22;S24/25		

**Additional advice on limit values**

During normal charging and discharging there is no release of product.

**Occupational exposure controls**

No specific precautions necessary.

**Protective and hygiene measures**

When using do not eat, drink or smoke. Wash hands before breaks and after work.

**Respiratory protection**

No specific precautions necessary.

**Hand protection**

No specific precautions necessary.

**Eye protection**

No specific precautions necessary.

**Skin protection**

No specific precautions necessary.

**9. Physical and Chemical Properties**

**Appearance**

Form: Solid  
 Color: Various  
 Odor: Odourless

**Important health, safety and environmental information**

Test method

pHValue: n.a.  
 Flash point: n.a.  
 Lower explosion limits: n.a.  
 Vapour pressure: n.a.  
 Density: n.a.



Water solubility:  
Ignition temperature:

Insoluble  
n.a.

## **10. Stability and Reactivity USA, EU**

### **Stability**

Stable

### **Conditions to avoid**

Keep away from open flames, hot surfaces and sources of ignition. Do not puncture, crush or incinerate.

### **Materials to avoid**

No materials to be especially mentioned.

### **Hazardous decomposition products**

In case of open cells, there is the possibility of hydrofluoric acid and carbon monoxide release.

### **Possibility of Hazardous Reactions**

Will not occur

### **Additional information**

No decomposition if stored and applied as directed.

## **11. Toxicological Information**

### **Empirical data on effects on humans**

If appropriately handled and if in accordance with the general hygienic rules, no damages to health have become known.

## **12. Ecological Information**

### **Further information**

Ecological injuries are not known or expected under normal use. Do not flush into surface water or sanitary sewer system.

## **13. Disposal Considerations**

### **Advice on disposal**

For recycling consult manufacturer.

### **Contaminated packaging**

Disposal in accordance with local regulations.

## **14. Transport Information**

The rechargeable Lithium-Ion battery pack as stated in Appendix are made in compliance to the requirements stated in the latest edition of the IATA Dangerous Goods Regulations Packing Instruction 965,966,967 section II such that they can be transported as a NOT RESTRICTED (non-hazardous/non-dangerous) goods. However, if those lithium-ion battery packs are pack with or contained in an equipment, then it is the responsibility of the shipper to ensure that the consignment are



packed in compliance to the latest edition of the IATA Dangerous Goods Regulations section II of either Packing Instruction 966 or 967 in order for that consignment to be declared as NOT RESTRICTED (non-hazardous/non-Dangerous).

With regard to transport, the following regulations are cited and considered:

- The International Civil Aviation Organization (ICAO) Technical Instructions, Packing Instruction 965,966,967 Section II (2013-2014 Edition),
- The International Air Transport Association (IATA) Dangerous Goods Regulations, Packing Instruction 965,966,967 Section II (54th Edition, 2013)
- The International Maritime Dangerous Goods (IMDG) Code (2010 Edition),
- US Hazardous Materials Regulations 49 CFR(Code of Federal Regulations) Sections 173-185 Lithium batterie and cells,
- The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria 38.3 Lithium batteries, Rev.5, Amend.1
- UN No. 3480 & UN No. 3481
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Our products are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to all the applicable international and national governmental regulations, not limited to the above mentioned. We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations (T1 – T8) on the Transport of Dangerous Goods Model Regulations and the Manual of Testes and Criteria that can be treated as “Non-Dangerous Goods”.

**Test results of the UN Recommendation on the Transport of Dangerous Goods**

<b>Manual of Test and Criteria (38.3 Lithium battery)</b>		<b>Test Results</b>	<b>Remark</b>
No	Test item		
T1	Altitude Simulation	Pass	
T2	Thermal Test	Pass	
T3	Vibration	Pass	
T4	Shock	Pass	
T5	External Short Circuit	Pass	
T6	Impact	Pass	
T7	Overcharge	Pass	
T8	Forced Discharge	Pass	

**15. Regulatory Information**

**U.S. Regulations**

**National Inventory TSCA**

All of the components are listed on the TSCA inventory.

**SARA**

To the best of our knowledge this product contains no toxic chemicals subject to the supplier notification requirements of Section 313 of the Superfund Amendments and Reauthorization Act (SARA/EPCRA) and the requirements of 40 CFR Part 372.

**Regulatory information EU**

**Labeling**

**Hazardous components which must be listed on the label**



As an article the product does not need to be labeled in accordance with EC directives or respective national laws.

**EU regulatory information**

1999/13/EC (VOC): 0 %

**16. Other Information**

**Hazardous Materials Information Label (HMIS)**

Health: 0  
Flammability: 0  
Physical Hazard: 0

**NFPA Hazard Ratings**

Health: 0  
Flammability: 0  
Reactivity: 0  
Unique Hazard:

**Full text of R-phrases referred to under sections 2 and 3**

- R10 Flammable.
- R20/22 Harmful by inhalation and if swallowed.
- R22 Harmful if swallowed.
- R34 Causes burns.
- R40 Limited evidence of a carcinogenic effect.
- R43 May cause sensitization by skin contact.
- R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- R49 May cause cancer by inhalation.
- R50 Very toxic to aquatic organisms.
- R53 May cause long-term adverse effects in the aquatic environment.

**Further Information**

Data of sections 4 to 8, as well as 10 to 12, do not necessarily refer to the use and the regular handling of the product (in this sense consult package leaflet and expert information), but to release of major amounts in case of accidents and irregularities. The information describes exclusively the safety requirements for the product

(s) and is based on the present level of our knowledge. This data does not constitute a guarantee for the characteristics of the product(s) as defined by the legal warranty regulations. "(n.a. = not applicable; n.d. = not determined)"

The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.