SAMSUNG SDI

Safety Data Sheet

Regulation : In accordance with Regulation (EU) 2020/878 (REACH), Annex II, and OSHA 29 CFR 1910.1200

Section I – IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

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 Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

1.1 Product identifier
Model name : INR18650-35E

Substance name : Lithium-ion batteries

Synonyms :

Lithium-ion Cell, Lithium-ion Pack, Lithium-ion Battery, Li-Ion Cell, Li-Ion Pack, Li-Ion Battery

REACH Registration No. : Not available

UFI Code : Not available

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

Relevant identified uses : Lithium-ion batteries

Uses advised against : Use for recommended use only

Further Information : Not available

1.3 Details of the supplier of the safety data sheet

Supplier : SAMSUNG SDI Co., Ltd.

Street address/P.O. Box : 150-20, Gongse-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea

Country ID/Postcode/Place :

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

Responsible Department: Quality team

e-mail address of competent person responsible for the SDS : Not available

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

1.4 Emergency Telephone

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

Opening hours : Not available

Other comments : Not available

1.5 Further Information

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

Nominal Voltage: 3.6 V

Rated Capacity: 3.4 Ah

Wh rating: 12.2 Wh

Anode (negative electrode): based on intercalation graphite

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

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.

Section II – HAZARDS IDENTIFICATION

※ This is a product that fulfills a certain function in solid state with specific shape without discharging any chemical substance in its use and has no obligation to write (M)SDS. Since this document contains the precautions for safe handling related to its materials or chemical substances consisting of this product, please note that these overall information is irrelevant to this product.

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) No. 1272/2008 [CLP] and OSHA 29 CFR 1910.1200 : Not classified

2.1.2 Additional information:

Classification of the substance or mixture.

Preparation Hazards and Classification: The product is a Lithium ion cell or battery and is therefore classified as an article and is not hazardous when used according to the recommendations of the manufacturer. The hazard is associated with the contents of the cell or battery. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the cell or battery integrity remains and the seals remain intact. The potential for exposure should not exist unless the cell or battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged. If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as Hazardous.

Hazardous Materials Information Label (HMIS)
Health: Not available
Flammability: Not available
Physical Hazard: Not available

NFPA Hazard Ratings
Health: Not available
Flammability: Not available
Reactivity: Not available

2.2 Label elements

Hazard pictograms : Not available

Signal word : Not available

Hazard statement : Not available

Precautionary statements: Not available

Supplemental Hazard information (EU) : Not applicable

2.3 Other hazards :

Appearance, Color and Odor: Solid object with no odor.

Primary Routes(s) of Exposure: These chemicals are contained in a sealed enclosure. Risk of exposure occurs only if the cell or pack is mechanically, thermally, electrically or physically abused to the point of compromising the enclosure.
If this occurs, exposure to the electrolyte solution contained within can occur by inhalation, ingestion, eye contact and skin contact.

Potential Health Effect(s):

Acute (short term): see Section 8 for exposure controls.
In the event that this cell or pack has been ruptured, the electrolyte solution contained within the cell would be corrosive and can cause burns to skin and eyes.
Inhalation: Inhalation of materials from a sealed cell is not an expected route of exposure. Vapors or mists from a ruptured cell may cause respiratory irritation.
Ingestion: Swallowing of materials from a sealed cell is not an expected route of exposure. Swallowing the contents of an open cell can cause serious chemical burns to mouth, esophagus, and gastrointestinal tract.
Skin: Contact between the cell and skin will not cause any harm. Skin contact with the contents of an open cell can cause severe irritation or burns to the skin.
Eye: Contact between the cell and the eye will not cause any harm. Eye contact with the contents of an open cell can cause severe irritation or burns to the eye.
CHRONIC (long term): see Section 11 for additional toxicological data.

Interactions with other chemicals: Immersion in high conductivity liquids may cause corrosion and breaching of the cell or battery enclosure. The electrolyte solution inside of the cells may react with alkaline (basic) materials and present a flammability hazard.

Potential Environmental Effects: Not Available.

Endocrine Disruptors Effects :

List of Substances identified as endocrine disruptors at EU level : Not listed

List of Substances under evaluation for endocrine disruption under an EU legislation : Not listed

List of Substances considered, by the evaluating National Authority, to have endocrine disrupting properties : Not listed

Section III – COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Mixture

CAS No.	EC No.	REACH Registration No.	%[weight]	Name	Common Name (Synonyms)	Classification according to Regulation(EC) No 1278/2008(CLP)
177997-13-6	700-042-6	-	35~40	Lithium nickel cobalt aluminum oxide	Not available	Not available
7782-42-5	231-955-3	-	10~15	Graphite	Not available	Not available
7440-50-8	231-159-6	-	10~15	Copper	Not available	Aquatic Chronic 2, H411 (granulated copper)
7439-89-6	231-096-4	-	10~15	Iron	Not available	Not available
7429-90-5	231-072-3	-	5~10	Aluminum(metal)	Not available	Pyr. Sol. 1, H250 Water-react. 2, H261 (Aluminium powder (pyrophoric)) (Aluminium powder (stabilised))
616-38-6	210-478-4	-	1~5	Dimethyl-carbonate	Not available	Flam. Liq. 2, H225
9002-88-4	618-339-3	-	1~5	Polyethylene	Not available	Not available
7440-21-3	231-130-8	-	1~5	Silicon	Not available	Not available
96-49-1	202-510-0	-	1~5	Ethylene-carbonate	Not available	Not available
114435-02-8	483-360-5	-	0.1~1	Fluoroethylene carbonate	Not available	Not available
171611-11-3	686-526-7	-	0.1~1	Lithium bis(fluorosulfonyl) imide	Not available	Not available
7440-02-0	231-111-4	-	0.1~1	Nickel	Not available	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372
554-13-2	209-062-5	-	0.1~1	Lithium carbonate	Not available	Not available

Further Information

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.

Section IV – FIRST-AID MEASURES

4.1 Description of first aid measures

Following eye contact :

- Rinse eyes with plenty of water for at least 15 minutes and seek medical attention.

Following skin contact :

- Remove contaminated clothing and wash before reuse.
- Immediately rinse contact area with plenty of clean water.
- Provide first aid to contacted area to prevent infection.
- Get medical attention.

Following inhalation :

- In case of inhalation of organic electrolyte mist, move from exposure to fresh air.
- If necessary give oxygen. Get medical attention.

Following ingestion :

- In case of ingestion of electrolyte don't induce vomiting.
- If patient is conscious and alert give 2~4 cupfuls of milk or water.
- Never give anything by mouth to an unconscious person.
- Get medical attention immediately.

Further 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.

4.2 Most important symptoms and effects, both acute and delayed

Acute effects : Not available

Delayed effects : Not available

4.3 Indication of immediate medical attention and special treatment needed

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Section V – FIRE-FIGHTING MEASURES

5.1 Extinguishing media

- When the scale of the fire is small, use a HFC (hydrofluorocarbon) clean-agent fire extinguisher or alcohol resistant foam fire extinguishers. (In case of battery overheating, wear protective gear and immerse heated battery in water)
- In case of large fire, use large amount of water to extinguish.

5.2 Special hazards arising from the substance or mixture

- Flammable gas leaks before ignition and then the product ignites.

5.3 Advice for firefighters

- The ignited battery has a high temperature, so there is a risk of additional ignition even if the fire is extinguished at early stage. Sprinkle a large amount of water until the battery temperature drops to normal temperature.
- If the battery is ignited in multi-stacked condition, multi-stack should be disassembled and then extinguished so that heat is not transferred between batteries
- In the event of a battery fire, cool it by spraying water directly on the battery.
- When handling a overheated battery, wear heat-resistant protective equipment.

Section VI – ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Protective equipment : Use personal protective equipment, see Section 8

Emergency procedures :

- In case of cell damage, possible release of dangerous substances and a flammable gas mixture.
- Eliminate all ignition sources.
- Please note that materials and conditions to avoid.
- Battery may emit electrolyte if charging or discharging rates exceed manufacturer's recommendations or if pack has been breached.
- Move battery to well ventilated area to prevent gas accumulation.

For emergency responders

- Eliminate all ignition sources.
- Please note that materials and conditions to avoid.
- Move battery to well ventilated area to prevent gas accumulation.

6.2 Environmental precautions :

- Avoid release to the environment.
- Prevent entry into waterways, sewers, basements or confined areas.

6.3 Methods and material for containment and cleaning up

For containment : Not available

For cleaning up :

- Cover with Dry earth, DRY sand or other non-combustible material and put on the plastic sheet to minimize spreading or contact with rain.
- Move battery to well ventilated area to prevent gas accumulation.
- Dispose in accordance with applicable local, state and federal regulations.

Other information: Not available

6.4 Reference to other sections

- See also sections 8 and 13 of the Safety Data Sheet.

Section VII – HANDLING AND STORAGE

7.1 Precautions for safe handling

- In case of cell damage, possible release of dangerous substances and a flammable gas mixture.
- The battery stores electrical energy and is capable of rapid energy discharge.
- Battery cell contents are under pressure.
- Handle battery carefully to avoid puncturing case or electrically shorting terminals.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions : Not available

Packaging materials : Not available

Requirements for storage rooms and vessels :

- Storage at room temperature (approx. 20℃) at approx. 40% of the nominal capacity
- Keep in closed original container.

7.3 Specific end use(s)

Recommendations : Not available

Industrial sector specific solutions : Not available

Section VIII – EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational Exposure limits

Name	ACGIH regulation	Biological exposure index	KOREA regulation	CHINA regulation	OSHA regulation	NIOSH regulation	EU regulation
Lithium nickel cobalt aluminum oxide	TWA = 0.2 mg/m^3 (Nickel Insoluable compounds), 0.02 mg/m^3 (Cobalt and inorganic compounds), 1 mg/m^3 (Aluminum metal and insoluble compounds)	Not available	TWA = 0.2 mg/m^3 (Insoluble Inorganic compounds, as Ni), 0.02 mg/m^3 (Cobalt and inorganic compounds), 10 mg/m^3 (Aluminum(Metal dust))	TWA = 1 mg/m^3 (Nickel and Nickel Insoluable compounds), 0.05 mg/m^3 (Cobalt and its compounds), STEL = 0.1 mg/m^3 (Cobalt and its compounds)	TWA = 1 mg/m^3 (Nickel insoluble compounds)	Ca TWA = 0.015 mg/m3 (Nickel insoluble compounds)	TWA = 0.01 mg/m^3 (Respirable fraction), 0.1 mg/m^3 (Inhalable fraction), TWA = 0.05 mg/m^3 (Inhalable fraction) (Limit value applies from January 18, 2025.) (Nickel

							compound)
Graphite	TWA = 2 mg/m^3	Not available	TWA = 2 mg/m^3	TWA = 4 mg/m^3 (Total dust), 2 mg/m^3 (Respirable dust) (Graphite dust)	TWA = 15 ppm (Natural)	TWA = 2.5 mg/m^3 (resp)	Not applicable
Copper	TWA = 0.2 mg/m^3 (Fume), TWA = 1 mg/m^3 (Dusts and mists)	Not available	TWA = 0.1 mg/m^3 (Copper(Fume)), TWA = 1 mg/m^3, STEL = 2 mg/m^3 (Copper(Dust & mist, as Cu))	TWA = 1 mg/m^3 (Copper dust), 0.2 mg/m^3 (Copper fume)	TWA = 0.1 mg/m^3 (Fume(as Cu)), 1 mg/m3 (Dusts and mists(as Cu))	TWA = 1 mg/m^3	Not applicable
Iron	Not applicable	Not available	TWA = 1 mg/m^3 (Iron salts(Soluble, as Fe))	Not applicable	Not applicable	Not applicable	Not applicable
Aluminum(metal)	TWA = 1 mg/m^3	Not available	TWA = 10 mg/m^3 (Aluminum(Metal dust))	TWA = 3 mg/m^3 (Aluminum metal, aluminum alloy dust)	TWA = 15 mg/m^3 (Total dust), 5 mg/m^3 (Respirable fraction)	TWA = 10 mg/m^3 (total), 5 mg/m^3 (resp)	Not applicable
Dimethyl-carbonate	Not applicable	Not available	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Polyethylene	Not applicable	Not available	Not applicable	TWA = 5 mg/m3 (Total dust) (Polyethylene dust)	Not applicable	Not applicable	Not applicable
Silicon	Not applicable	Not available	TWA = 10 mg/m^3	Not applicable	TWA = 15 mg/m^3 (Total dust), 5 mg/m^3 (Respirable fraction)	TWA = 10 mg/m^3 (total), 5 mg/m^3 (resp)	Not applicable
Ethylene-carbonate	Not applicable	Not available	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Fluoroethylene carbonate	Not applicable	Not available	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

Lithium bis(fluorosulfonyl) imide	Not applicable	Not available	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Nickel	TWA = 1.5 mg/m^3	Not available	TWA = 1 mg/m^3 (Nickel(Metal))	TWA = 1 mg/m^3 (Nickel and Nickel Insoluable compounds)	TWA = 1 mg/m^3 (Nickel, metal and insoluble compounds (as Ni))	Ca TWA = 0.015 mg/m^3 (Nickel metal and other compounds (as Ni))	Not applicable
Lithium carbonate	Not applicable	Not available	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

8.2 Exposure controls

8.2.1 Appropriate engineering controls :

Substance/mixture related measures to prevent exposure during identified uses:

- Avoid charging batteries in areas where hydrogen gas accumulate.
- Use local exhaust ventilation to maintain concentrations of hydrogen below the Lower Explosive collect and transport flammable gases in ventilation systems.
- Insure proper ventilation is present and electrolyte mist and vapours.

Structural measures to prevent exposure:

- Avoid charging batteries in areas where hydrogen gas accumulate.
- Use local exhaust ventilation to maintain concentrations of hydrogen below the Lower Explosive collect and transport flammable gases in ventilation systems.
- Insure proper ventilation is present and electrolyte mist and vapours.

Organisational measures to prevent exposure: Not available

Technical measures to prevent exposure:

- Insure proper ventilation is present and electrolyte mist and vapours.

8.2.2 Individual protection measures, such as personal protective equipment :

Eye and face protection

- Wear ANSI approved safety glasses with side shield during normal use.
- Wear NIOSH approved face shield with safety glasses and H.V protection during intentional disassembly.

Skin protection

Hand protection

- Wear nitrile butyl rubber, neoprene, or PVC glove during battery component disassembly.
- Discard contaminated work clothing after one work day.

Other skin protection

- Wear protective clothing during battery component disassembly.
- Discard contaminated work clothing after one work day.

Respiratory protection :

- None required during normal use.
- Wear NIOSH or European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment when necessary.
- In lack of oxygen(< 19.5%), wear the supplied-air respirator or self-contained oxygen breathing apparatus.
- In case exposed to particulate material, the respiratory protective equipments as follow are recommended; facepiece filtering respirator or air-purifying respirator, high-efficiency particulate air(HEPA) filter media or respirator equipped with powered fan, filter media of use (dust, mist, fume)

8.2.3 Environmental exposure controls

Substance/mixture related measures to prevent exposure: Not available

Instruction measures to prevent exposure: Not available

Organisational measures to prevent exposure: Not available

Technical measures to prevent exposure: Not available

Section IX – PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance

Description : Solid

Color : Not available

Odor : Odorless

Odor threshold : Not available

pH : Not available

Melting point/freezing point : Not available

Initial boiling point and boiling range : Not available

Flash point : Not available

Evaporation rate : Not available

Flammability (solid, gas) : Not available

Upper/lower flammability or explosive limits : Not available

Vapor pressure : Not available

Solubility (ies) : insoluble.

Vapor density : Not available

Relative density : Not available

Partition coefficient: n-octanol/water : Not available

Auto ignition temperature : Not available

Decomposition temperature : Not available

Viscosity : Not available

Explosive properties : Not available

Oxidizing properties : Not available

Molecular weight : Not available

9.2 Other information

Not available

Section X – STABILITY AND REACTIVITY

10.1 Reactivity

- Stable at ambient temperature.

10.2 Chemical stability

- There is no hazard when the measures for handling and storage are followed.
- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Will not occur under normal conditions.
- In case of cell damage, possible release of dangerous substances and a flammable gas mixture.
- Containers may explode when heated.
- Fire may produce irritating and/or toxic gases.
- Some liquids produce vapors that may cause dizziness or suffocation.
- Inhalation of material may be harmful.

10.4 Conditions to avoid

- Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- Friction, heat, sparks or flames
- Dusts or shavings from borings, turnings, cuttings, etc.
- Do not exceed manufacturer’s recommendation for charging or use battery for an application for which it was not specifically designed.
- Do not electrically short.

10.5 Incompatible materials

- Avoid contact with acids and oxidizers.
- Keep away from any possible contact with water, because of violent reaction and possible flash fire.
- Handle under inert gas. Protect from moisture.
- Combustibles, reducing agents

10.6 Hazardous decomposition products

- None under normal conditions.
- Corrosive and/or toxic fume
- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning.
- Irritating and/or toxic gases

Section XI – TOXICOLOGICAL INFORMATION

※ This is a product that fulfills a certain function in solid state with specific shape without discharging any chemical substance in its use and has no obligation to write (M)SDS. Since this document contains the precautions for safe handling related to its materials or chemical substances consisting of this product, please note that these overall information is irrelevant to this product.

11.1 Information on toxicological effects

Acute toxicity

Oral : Category 4 (300 < ATEmix ≤ 2,000 mg/kg bw)

- Lithium nickel cobalt aluminum oxide : LD50 > 2,000 mg/kg (OECD Guideline 420, GLP)
- Graphite : LD50(Rat) > 2,000 mg/kg (OECD Guideline 423, GLP)
- Copper : LD50 = 300 ~ 500 mg/kg (Rat)(oral gavage, male/female, OECD TG 423, GLP)
- Iron : LD50 = 98.6 (Rat)(exposure route: gavage, male, OECD TG 401)
- Aluminum(metal) : LD50 > 15,900 mg/kg (Rat) (OECD TG 401)
- Dimethyl-carbonate : LD50 > 5,000 mg/kg (Rat)
- Polyethylene : LD50(Rat) > 8,000 mg/kg
- Silicon : LD50(Rat) > 5,000 mg/kg bw (OECD Guideline 401, GLP)
- Ethylene-carbonate : LD50 = 10,000 mg/kg (Rat)
- Fluoroethylene carbonate : LD50 = 500 mg/kg bw (Rat) (OECD Guideline 423, GLP)
- Lithium bis(fluorosulfonyl) imide : LD50 = 300 ~ 2,000 mg/kg bw (Rat) (OECD Guideline 423, GLP)
- Nickel : LD50 > 9,000 mg/kg (Rat)
- Lithium carbonate : Rat LD50 = 525 mg/kg bw

Dermal : Not classified (ATEmix > 2,000 mg/kg bw)

- Lithium nickel cobalt aluminum oxide : LD50(Rat) > 2,000 mg/kg (EPA OPPTS 870.1200, GLP)
- Copper : LD50 > 2,000 mg/kg (Rat)(male/female, OECD TG 402, GLP)
- Iron : LD50 = 20,000 mg/kg (Guinea pig)
- Dimethyl-carbonate : LD50 > 2,000 mg/kg (Rabbit)
- Silicon : LD50(Rabbit) > 5,000 mg/kg bw
- Ethylene-carbonate : LD50 > 3,000 mg/kg (Rabbit)
- Fluoroethylene carbonate : LD50 > 2,000 mg/kg bw (Rat) (OECD Guideline 402, GLP)
- Lithium bis(fluorosulfonyl) imide : LD50 > 2,000 mg/kg bw (Rat) (OECD Guideline 402, GLP)
- Lithium carbonate : Rabbit LD50 > 3,000 mg/kg bw (OECD Guideline 402)

Inhalation : Category 2 (0.05 < ATEmix ≤ 0.5 mg/L)

- Lithium nickel cobalt aluminum oxide : LC50(Rat) = 0.15 mg/L air, 4hr(OECD Guideline 403, GLP)
- Graphite : LC50(Rat)(Dust) > 2,000 mg/L/4hr (OECD Guideline 403, GLP)
- Copper : Gas LC50 > 5.11 mg/L/4hr (Rat)(male/female, OECD TG 436, GLP)
- Iron : Dust LC50 > 250 mg/m^3/6hr (Rat(Male))
- Aluminum(metal) : Dust LC50 > 0.888 mg/L/4hr (Rat) (OECD TG 403, GLP)
- Dimethyl-carbonate : Vapor LC50 > 5.36 mg/L/4hr (Rat)
- Polyethylene : Dust LC50(Rat) = 75.5 mg/L/30min
- Nickel : Dust LC50 = 10,200 mg/kg
- Lithium carbonate : Rat LC50 > 2 mg/L/4hr (dust) (OECD Guideline 403, GLP)

Skin corrosion/ irritation : Category 1

- Lithium nickel cobalt aluminum oxide : Classified as Category 1 as a result of the test using rabbit.(OECD Guideline 404, GLP)
- Graphite : Not irritating as a result of the skin corrosion/irritation test using rabbit. (OECD Guideline 404,GLP)

- Copper : Edema score: 0/0, no irritation, Rabbit, OECD TG 404
- Iron : edema score: 0/0, no irritation, Rabbit, OECD TG 404
- Aluminum(metal) : Not classified as skin irritant as a result of the test using rabbit.(Read-across: aluminium oxide TBH OECD TG 404, GLP)
- Dimethyl-carbonate : Not irritating(rabbit)
- Silicon : Not irritating in the skin irritation test using rabbit.(OECD Guideline 404, GLP)
- Ethylene-carbonate : Slight irritation observed in the OPEN DRAIZE TEST using rabbit
- Fluoroethylene carbonate : Not classified as a result of In Vitro Skin Corrosion test using human skin model. (OECD Guideline 431, GLP)
- Lithium bis(fluorosulfonyl) imide : Classified as category 2 in the skin irritation/corrosion test using rabbit. (OECD Guideline 404, GLP)
- Nickel : No irritation was observed as a result of the test using rabbit. (OECD TG 404, GLP)
- Lithium carbonate : Not classified as a skin irritant in a skin irritation test using rabbits (OECD Guideline 404, GLP)

Serious eye damage/ irritation : Category 1
- Lithium nickel cobalt aluminum oxide : Classified as category 1 in the test using the SkinEthic RHC model (Reconstituted human corneal model). (OECD Guideline 492, GLP)
- Graphite : Not irritating as a result of the eye damage/irritation test using rabbit. (OECD Guideline 405,GLP)
- Copper : Slightly irritant, Rabbit, Corneal opacity (1), Iris (0.6), Conjunctival hyperemia (1.8), Conjunctival edema (1.1), Fully reversible within 14 days, OECD TG 405
- Iron : No irritation, Rabbit, cornea opacity score(0), iris score(0), conjunctivae score(0), OECD TG 405
- Aluminum(metal) : No irritation was observed as a result of the test using rabbit.(Read-across: aluminium oxide TBH FDA of the United States
- Dimethyl-carbonate : Slight irritation(rabbit)
- Silicon : Not irritating in the eye irritation test using rabbit.(OECD Guideline 405, GLP)(Read-across : Silicon dioxide)
- Ethylene-carbonate : Slight irritation was observed as a result of the test using rabbit.
- Fluoroethylene carbonate : Not classified as a eye irritant in the eye irritation test using bovine cornea. (OECD Guideline 437, GLP)
- Lithium bis(fluorosulfonyl) imide : Classified as category 1 in the eye irritation/corrosion test using rabbit. (OECD Guideline 405, GLP)
- Nickel : No irritation was observed as a result of the test using rabbit. (Read-across: 7786-81-4 OECD TG 405, GLP)
- Lithium carbonate : Irritating as category 2 in the eye irritation test using rabbit (OECD Guideline 405, GLP)

Respiratory sensitization: Not classified
- Aluminum(metal) : No sensitization was observed as a result of the test using mouse(male). (Read-across: Aluminium oxide)
- Nickel : Fumes cause respiratory sensitization

Skin sensitization : Category 1
- Lithium nickel cobalt aluminum oxide : No sensitization was observed as a result of the test using mouse.(OECD Guideline 429, GLP)
- Graphite : No sensitization was observed as a result of skin sensitization test using mouse.(OECD Guideline 429,GLP)
- Copper : Category 2(Copper and its compounds)(according to NITE)
- Iron : No sensitization, Guinea pig
- Aluminum(metal) : No sensitization was observed as a result of the test using guinea pig.(Read-across: Aluminium oxide AK 43/79 and aluminium oxide AK 44/79)
- Fluoroethylene carbonate : Category 1 sensitiser as a result of the test using mouse.(LLNA)(OECD Guideline 429, GLP)

- Lithium bis(fluorosulfonyl) imide : No sensitization was observed as a result of the test using guinea pig.(OECD Guideline 406, GLP)
- Nickel : skin sensitization
- Lithium carbonate : No sensitization was observed as a result of the test using guinea pig. (OECD Guideline 406, GLP)

Carcinogenicity : Catyegory 1A

IARC
- Lithium nickel cobalt aluminum oxide : Group 1 (Nickel compounds)(Nickel, metallic), Group 2A (Cobalt and cobalt compounds)(Cobalt metal)
- Polyethylene : Group 3
- Nickel : Group 2B

NTP
- Lithium nickel cobalt aluminum oxide : K (Nickel Compounds), R (Cobalt-Related Exposures)
- Nickel : R

OSHA
- Lithium nickel cobalt aluminum oxide : Present (Cobalt and inorganic compounds)

ACGIH
- Lithium nickel cobalt aluminum oxide : A1 (Nickel Insoluable compounds), A3 (Cobalt and inorganic compounds), A4 (Aluminum metal and insoluble compounds)
- Aluminum(metal) : A4
- Lithium bis(fluorosulfonyl) imide : A4 (Fluoride)
- Nickel : A5

KOREA-ISHL
- Lithium Nickel Oxide : 1A ((Insoluble Inorganic compounds, as Ni), 2 (Cobalt and inorganic compounds)
- Nickel : 2

EU
- Lithium nickel cobalt aluminum oxide : Carc. 2 (Nickel Compounds)
- Nickel : Carc. 2

Mutagenicity : Not classified
- Lithium nickel cobalt aluminum oxide :
  In vitro : [Negative] ; Bacterial Reverse Mutation Assay(OECD Guideline 471, GLP)
  In vitro : [Negative] ; In Vitro Mammalian Chromosome Aberration Test(OECD Guideline 473, GLP)
  In vitro : [Negative] ; In Vitro Mammalian Cell Gene Mutation Test(OECD Guideline 476, GLP)
- Graphite :
  In vitro : [Negative] ; In Vitro Mammalian Cell Gene Mutation Test(OECD TG 476,GLP)
  In vitro : [Negative] ; Bacterial Reverse Mutation Test (Ames) (OECD TG 471,GLP)
  In vitro : [Negative] ; In Vitro Mammalian Chromosomal Aberration Test (OECD TG 473,GLP)
- Copper : In vitro : [Negative] ; Bacterial Reverse Mutation Assay(OECD Guideline 471)
- Iron : In vitro : [Negative] ; Bacterial Reverse Mutation Assay, OECD TG 471
- Aluminum(metal) : Not classified based on the data on KOSHA Website
- Silicon :
  In vivo : [Negative] (Read-across)
  In vitro : [Negative] ; Comet Assay (Read-across)
- Ethylene-carbonate : In vitro : [Negative] ; Bacterial Reverse Mutation Assay
- Fluoroethylene carbonate :
  In vivo : [Negative] ; Mammalian Erythrocyte Micronucleus Test(OECD Guideline 474, GLP)
  In vivo : [Negative] ; In vivo Mammalian Alkaline Comet Assay(OECD Guideline 489, GLP)
  In vitro : [positive] ; In Vitro Mammalian Chromosome Aberration Test(OECD Guideline 473, GLP)
  In vitro : [positive] ; Bacterial Reverse Mutation Assay(OECD Guideline 471, GLP)
- Lithium bis(fluorosulfonyl) imide :
  In vivo : [Negative] ; Mammalian Erythrocyte Micronucleus Test(OECD Guideline 474, GLP)
  In vitro : [Negative] ; In Vitro Mammalian Chromosome Aberration Test(OECD Guideline 473, GLP)

In vitro : [Negative] ; Bacterial Reverse Mutation Assay(OECD Guideline 471, GLP)
- Lithium carbonate :
In vivo : [Negative] ; Based on the results of mutagenic tests on various lithium salts, lithium carbonate is considered to be non-genotoxic.
In vitro : [Negative] ; In Vitro Mammalian Cell Gene Mutation Test(OECD Guideline 476, GLP)

Reproductive toxicity : Category 1B
- Lithium nickel cobalt aluminum oxide : Classified as category 1B as a result of Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test using rats. (NOAEL(P0) = 30 mg/kg bw/day, NOAEL(F1) = 30 mg/kg bw/day)(OECD TG 422, GLP)(Read-across; Cobalt)
- Graphite : No reproduction toxicity was observed as a result of reproduction toxicity test using rat.(OECD Guideline 422, GLP)
- Copper : Not classified based on the data of EU REACH registered substance factsheets.
- Aluminum(metal) : Not classified based on the data on KOSHA Website
- Dimethyl-carbonate : Classified as Category 2 according to the data on NITE
- Silicon : Not classified as a reproduction toxicant as a result of Rodent Dominant Lethal Test using rat. (OECD Guideline 478)
- Fluoroethylene carbonate : No adverse effects was observed as a result of the Reproduction / Developmental Toxicity Screening Test using rats. (OECD Guideline 421, GLP)
- Lithium bis(fluorosulfonyl) imide : Not classified as a reproduction toxicant as a result of t combined repeated Dose Toxicity Study with the reproduction/ Developmental Toxicity Screening test using rat. (NOAEL = ca. 90 mg/kg bw/day) (OECD Guideline 422, GLP)
- Nickel : Oral developmental toxicity test result, NOAEL = 1.1 mg/kg bw/day (OECD TG 416) (OECD) As a result of the second-generation rat reproductive toxicity test (OECD TG 416), no effects related to reproductive and developmental toxicity were observed up to the highest concentration. NOAEL=10 mg/kg bw/day
- Lithium carbonate : No adverse effects was observed as a result of the reproductive/developmental toxicity test using rats. (OECD Guideline 416, GLP), (OECD Guideline 414, GLP)

Specific target organ toxicity (single exposure) : Category 3 (narcotic effects)
- Graphite : Not classified as a specific target organ toxicant(single exposure) according to the acute oral toxicity test and the acute inhalation toxicity test(OECD Guideline 404,GLP)
- Copper : Clinical signs including lethargy, diarrhoea, decreased respiration rate, laboured respiration, ataxia were observed in the acute oral toxicity test using rats. (OECD Guideline 423, GLP)
- Iron : Clinical signs in the acute oral toxicity test using rats : Inactivity and depression of the animals within a few minutes after administration. Anorexia, oligodipsia, oliguria, alkalosis, diarrhea, loss of body weight (Rat, OECD TG 401)
- Aluminum(metal) : Not classified based on the data on KOSHA Website. (data lacking for classification)
- Polyethylene : Inhalation of dust cause rat pulmonary(lung) inflammation in the test.
- Silicon : Not classified as a result of the acute oral toxicity test using rat. (No adverse clinical signs)(OECD Guideline 401, GLP)
- Fluoroethylene carbonate : Classified as Category 3(narcotic effects) as a result of the acute oral toxicity test using rat. (Adverse effects : hypoactivity) (OECD Guideline 423, GLP)
- Lithium bis(fluorosulfonyl) imide : No significant toxicity was observed according to the acute oral toxicity and the acute dermal toxicity test. (OECD Guideline 423, GLP)(OECD Guideline 402, GLP)
- Nickel : Causes pulmonary edema and kidney failure
- Lithium carbonate : Classified as Category 3(respiratory irritation) as a result of the acute inhalation toxicity test using rat. (Adverse effects : respiratory distress) (OECD Guideline 403, GLP)

Specific target organ toxicity (repeat exposure) : Category 1 (blood system)
- Lithium nickel cobalt aluminum oxide : In the repeated dose toxicity(oral) test for 42days, severe extramedullary haemopoiesis was observed in spleen of rats dosed at 150, 500 mg/kg/day. (NOAEL = 50 mg/kg/day)(OECD Guideline 422, GLP)

- Graphite : Not classified as a specific target organ toxicant(repeated exposure) as a result of the repeated oral toxicity test and the repeated inhalation toxicity test(OECD TG 422, GLP)(OECD TG 412, GLP)
- Copper : No significant toxicity was observed according to the repeated oral toxicity test using rats.(EU Method B.26, GLP)
- Iron : In the sub-chronic repeated oral toxicity test using rats, no critical target organ toxicity observed. In the repeated inhalation toxicity test for 28 days using rats, no critical target organ toxicity observed.
- Aluminum(metal) : Not classified based on the data on KOSHA Website. (data lacking for classification)
Not classified based on the data of EU REACH registered substance factsheets.
- Dimethyl-carbonate : Not classified based on the data on KOSHA Website(Source: Occupational Safety and Health Research Institute 2020 inhalation toxicity test and evaluation results)
- Silicon : Not classified as a result of the repeated toxicity test using rat. (OECD Guideline 452)
- Fluoroethylene carbonate : Classified as a specific target organ toxicant Category 1(teeth) as a result of the Reproduction / Developmental Toxicity Screening Test using rats. (OECD Guideline 421, GLP)
- Lithium bis(fluorosulfonyl) imide : Not classified as a specific target organ toxicant as a result of t combined repeated Dose Toxicity Study with the reproduction/ Developmental Toxicity Screening test using rat.(OECD Guideline 422, GLP)
- Nickel : Repeated inhalation toxicity has serious effects on the lungs, causing chronic inflammation and fibrosis.
- Lithium carbonate : Not classified as a specific target organ toxicant as a result of the Repeated oral toxicity test based on human data. (NOAEL = 6.43 mg/kg bw/day (nominal))

Aspiration Hazard : Not available

11.2 Other Information

Endocrine disruptors property : The components of the product are not included in the list of substances identified as having endocrine disruptors properties.

Section XII – ECOLOGICAL INFORMATION

※ This is a product that fulfills a certain function in solid state with specific shape without discharging any chemical substance in its use and has no obligation to write (M)SDS. Since this document contains the precautions for safe handling related to its materials or chemical substances consisting of this product, please note that these overall information is irrelevant to this product.

12.1 Ecological toxicity

- Acute toxicity : Category 1

Fish

- Graphite : 96h-LC50 > 100 mg/L (Danio rerio, OECD Guideline 203, GLP)
- Copper : 96h-LC50 = 193 µg/L Pimephales promelas (Flow-through, Freshwater)
- Iron : 96h-LC50 = 8.65 mg/L Oncorhynchus mykiss (static, fresh water)
- Ethylene-carbonate : 96h-LC50 = 238.065 mg/L (ECOSAR)
- Fluoroethylene carbonate : 96h-LC50 = 6 ~ 60 mg/L (Danio rerio) (OECD Guideline 203, GLP)
- Lithium bis(fluorosulfonyl) imide : 96h-LC50 = 0.1 ~ 100 mg/L (Danio rerio) (OECD Guideline 203, GLP)
- Nickel : NOEC = 0.04 mg/L ~ 1.1 mg/L Brachydanio rerio
- Lithium carbonate : 96h-LC50(Oncorhynchus mykiss) = 30.3 mg/L (OECD Guideline 203, GLP)

Crustacean

- Graphite : 48h-EC50 > 100 mg/L (Daphnia magna, OECD Guideline 202 ,GLP)
- Copper : 48h-LC50 = 7.2E-5 ~ 5.36 mg/L Crustaceans (Median value: 0.044 mg/L)

- Iron : 96h-LC50 = 0.63 mg/L (semi-static, fresh water)
- Aluminum(metal) : 48h-NOEC > 100 mg/L Daphnia magna
- Ethylene-carbonate : 48h-LC50 = 9423.147 mg/L (ECOSAR)
- Fluoroethylene carbonate : 48h-EC50 = 8.4 mg/L (Daphnia magna) (OECD Guideline 202, GLP)
- Lithium bis(fluorosulfonyl) imide : 48h-EC50 > 100 mg/L (Daphnia magna) (OECD Guideline 202, GLP)
- Lithium carbonate : 48h-EC50(Daphnia magna) = 33.2 mg/L (OECD Guideline 202, GLP)

Algae

- Graphite : 72h-ErC50 > 100 mg/L (Pseudokirchnerella subcapitata, OECD Guideline 201,GLP)
- Copper : 7d-NOEC = 30 µg/L Lemna minor (Static, Freshwater)
- Iron : 72h-EC50 = 18 mg/L (OECD TG 201)
- Aluminum(metal) : 72h-NOEC ≥ 0.052 mg/L Selenastrum capricornutum(OECD TG 201, GLP)
- Silicon : 72h-EC50(Raphidocelis subcapitata) = 250 mg/L(OECD Guideline 201)
- Ethylene-carbonate : 96h-EC50 = 17.388 mg/L (ECOSAR)
- Fluoroethylene carbonate : 72h-EC50 = 32 mg/L (Raphidocelis subcapitata) (OECD Guideline 201, GLP)
- Lithium bis(fluorosulfonyl) imide : 72h-EC50 > 100 mg/L (Raphidocelis subcapitata) (OECD Guideline 201, GLP)
- Lithium carbonate : 72h-EC50(Desmodesmus subspicatus) > 400 mg/L (OECD Guideline 201, GLP)

- Chronic toxicity : Category 1

Fish

- Lithium nickel cobalt aluminum oxide : As a result of the hazard review of the National Institute of Environmental Research of Korea, it was classified as aquatic chronic category 1.
- Nickel : Fish 28d-NOEC =21.7 mg/L ASTM 2004, APHA 1998, GLP
- Lithium carbonate : 34d-NOEC(Danio rerio) = 17.35 mg/L (OECD Guideline 210, GLP)

Crustacean

- Aluminum(metal) : 21d-NOEC = 0.076 mg/Lreproduction, 0.137 mg/L Daphnia magna, immobilization OECD TG 211, GLP
- Lithium carbonate : 21d-NOEC(Daphnia magna) = 1.7 mg/L (OECD Guideline 211, GLP)

Algae

- Graphite : 72h-NOEC ≥ 100 mg/L ((Pseudokirchnerella subcapitata, OECD Guideline 201,GLP)
- Fluoroethylene carbonate : 72h-NOEC = 2.2 mg/L (Raphidocelis subcapitata) (OECD Guideline 201, GLP)
- Lithium carbonate : 72h-NOEC(Desmodesmus subspicatus) = 50 mg/L (OECD Guideline 201, GLP)

12.2 Persistence and degradability

Persistence

- Copper : -0.57 (estimated)
- Dimethyl-carbonate : log Kow = 0.354 (20℃)
- Ethylene-carbonate : log Kow = -0.340
- Fluoroethylene carbonate : log Pow = -0.435
- Lithium bis(fluorosulfonyl) imide : log Pow <= 3
- Lithium carbonate : Not applicable (Inorganic)

Degradability : Not available

12.3 Bioaccumulative potential

Bioaccumulation

- Lithium carbonate : Not applicable (Lithium salts are not considered to bioaccumulate in the aquatic environment.)

Biodegradation

- Fluoroethylene carbonate: Readily biodegradable(After 28 days = 65% degradation)(OECD Guideline 301D, GLP)

- Lithium bis(fluorosulfonyl) imide : Readily biodegradable(After 28 days = 100% degradation)(QSAR/QSPR)

12.4 Mobility in soil

- Ethylene-carbonate : 9.2
- Lithium carbonate : Kd = 280 L/kg

12.5 Results of PBT and vPvB assessment : Most of the components of the product are metals, and PBT asessments are not relevant to metals

12.6 Other adverse effects : Not available

Section XIII – DISPOSAL CONSIDERATION

13.1 Waste treatment methods

Product/Packaging disposal

- Consider the required attentions in accordance with waste treatment management regulation.

Waste codes / Waste designation according to LoW(2015) : 16-06-05

Waste treatment-relevant information

- Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Sewage disposal-relevant information: Not available

Other disposal recommendations: Not available

Section XIV – TRANSPORTATION INFORMATION

※ If those lithium-ion batteries are packed 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). If those lithium-ion batteries are packed with or contained in an equipment, UN No. is UN3481.

14.1 UN Number : 3480

14.2 UN Proper shipping name : LITHIUM ION BATTERIES

14.3 Transport Hazard class : 9 (applicable for air transport)

14.4 Packing group : -

14.5 Special provisions : 188, 230, 384

14.6 Packing instructions : P903

14.7 Environmental hazards : No

14.8 Special precautions for user

in case of fire : F-A

in case of leakage : S-I

14.9 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not Available

14.10 IATA Transport : PI 965-Section IB

14.11 Package labels

IMDG

IATA


Section XV – REGULATORY INFORMATION

15.1 Safety, health and environmental regulation/legislation specific for the substance or mixture

EU regulations

Authorisations and/or restrictions on use:

Authorisations: Not regulated

Restrictions on use:

- Lithium nickel cobalt aluminium oxide: Regulated (Nickel compounds)
- Nickel: Regulated

Other EU regulations

SVHC list: Not regulated

Harmonized classification – Annex VI of Regulation (EC) No 1272/2008 (CLP Regulation):

- Copper: Aquatic Chronic 2, H411 (granulated copper)
- Aluminum(metal): Pyr. Sol. 1, H250, Water-react. 2, H261(Aluminium powder (pyrophoric)) (Aluminium powder (stabilised))
- Dimethyl-carbonate: Flam. Liq. 2, H225
- Nickel: Skin Sens. 1, H317, Carc. 2, H351, STOT RE 1, H372

KOREA regulations

Occupational Safety and Health Act

CAS No.	Prohibited Substance	Substance subject to authorization	Hazardous Substances Subject to Control	Harmful Agents Subject to Work Environment Monitoring	Harmful Agents Subject to Workers Requiring Health Examination	Threshold Limit Values (TLVs) chemicals	Chemicals subject to permissible exposure limit	Substance subject to PSM
177997-13-6	Not regulated	Not regulated	Regulated (Special management materials)	Regulated	Regulated	Regulated	Regulated	Not regulated
7782-42-5	Not regulated	Not regulated	Not regulated	Regulated	Regulated	Regulated	Not regulated	Not regulated
7440-50-8	Not regulated	Not regulated	Regulated	Regulated	Regulated	Regulated	Not regulated	Not regulated
7439-89-6	Not regulated	Not regulated	Regulated	Not regulated	Not regulated	Regulated	Not regulated	Not regulated
7429-90-5	Not regulated	Not regulated	Regulated	Regulated	Regulated	Regulated	Not regulated	Not regulated
616-38-6	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Regulated
9002-88-4	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
7440-21-3	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Regulated	Not regulated	Not regulated
96-49-1	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
114435-02-8	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
171611-11-3	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
7440-02-0	Not regulated	Not regulated	Regulated	Regulated	Regulated	Regulated	Regulated	Not regulated
554-13-2	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated	Not regulated

Chemicals Control Act

CAS No.	Phase-in substance	Hazardous Chemical Substance t	Substances subject to intensive control	CMR substance	Substance requiring preparation for accidents
177997-13-6	2015-3-6482	Toxic substance (2023-1-1126, 1%)	Not regulated	Not regulated	Not regulated
7782-42-5	KE-18101	Not regulated	Not regulated	Not regulated	Not regulated
7440-50-8	KE-08896	Not regulated	Not regulated	Not regulated	Not regulated
7439-89-6	KE-21059	Not regulated	Not regulated	Not regulated	Not regulated
7429-90-5	KE-00881	Not regulated	Not regulated	Not regulated	Not regulated
616-38-6	KE-11278	Not regulated	Not regulated	Not regulated	Not regulated
9002-88-4	KE-28877	Not regulated	Not regulated	Not regulated	Not regulated
7440-21-3	KE-31029	Not regulated	Not regulated	Not regulated	Not regulated
96-49-1	KE-12028	Not regulated	Not regulated	Not regulated	Not regulated
114435-02-8	2004-3-2827	Not regulated	Not regulated	Not regulated	Not regulated
171611-11-3	2013-1-674	Toxic substance (2013-1-674, 25%)	Not regulated	Not regulated	Not regulated
7440-02-0	KE-25818	Not regulated	Not regulated	Not regulated	Not regulated
554-13-2	KE-22550	Not regulated	Not regulated	Not regulated	Not regulated

Safety Control of Dangerous Substances Act

- Iron : Category II, Combustible Solids, Iron powders, 500kg
- Aluminum(metal) : Category II, Combustible Solids, Metal powders, 500kg
- Dimethyl-carbonate : Category IV, Class I petroleums (water-soluble), 200L
- Silicon : Category II, Combustible Solids, Metal powders, 500kg (Silicon powder)
- Ethylene-carbonate : Non-dangerous goods
- Fluoroethylene carbonate : Category IV, Class III petroleums (water-soluble), 2000L
- Nickel : Non-dangerous goods
- Lithium carbonate : Non-dangerous goods

Wastes Control Act

- Lithium nickel cobalt aluminum oxide : Designated wastes (waste toxic substances)
- Copper : Designated wastes
- Iron : Designated wastes
- Aluminum(metal) : Designated wastes
- Polyethylene : Designated wastes (waste synthetic polymer compounds)
- Silicon : Designated wastes
- Lithium bis(fluorosulfonyl) imide : Designated wastes (waste toxic substances)

- Nickel : Designated wastes

Persistant Organic Pollutants Acts: Not regulated

CHINA regulations

Measures for the Environmental Management Registration of New Chemical Substances (新化学物质环境管理办法)

Inventory of Existing Chemical Substances Produced or Imported in China (IECSC)(中国现有化学品名录):

- Lithium nickel cobalt aluminum oxide: Not listed
- Graphite: Listed
- Copper: Listed
- Iron: Listed
- Aluminum(metal) : Listed
- Dimethyl-carbonate: Listed
- Polyethylene: Listed
- Silicon: Listed
- Ethylene-carbonate: Listed
- Fluoroethylene carbonate: Not listed
- Lithium bis(fluorosulfonyl) imide: Not listed
- Nickel: Listed
- Lithium carbonate: Listed

Law of the People's Republic of China on the Prevention and Control of Occupational Diseases(中华人民共和国职业病防治法)

The Regulations on Labor Protection in Workplaces Where Toxic Substances are used(使用有毒物品作业场所劳动保护条例):

- Graphite: Regulated
- Copper: Regulated (Copper and its compounds)
- Iron: Regulated
- Aluminum(metal) : Regulated
- Polyethylene: Regulated
- Nickel: Regulated (Nickel and its compounds)

Regulation on the Safety Management of Hazardous Chemicals Catalog of Hazardous Chemicals(2022) (危险化学品安全管理条例):

- Aluminum(metal) : Regulated (Aluminum powder)
- Dimethyl-carbonate: Regulated
- Silicon: Regulated (Silica powder [amorphous])

List of Dangerous Goods(危险货物品名表) :

- Silicon: Reguated (1346 (Amorphous silica powder))

U.S.A regulations

U.S.A Inventory (TSCA)

- Lithium nickel cobalt aluminum oxide: Listed
- Graphite: Listed
- Copper: Listed
- Iron: Listed
- Aluminum(metal) : Listed
- Dimethyl-carbonate: Listed
- Polyethylene: Listed
- Silicon: Listed
- Ethylene-carbonate: Listed
- Fluoroethylene carbonate: Listed
- Lithium bis(fluorosulfonyl) imide: Listed
- Nickel: Listed
- Lithium carbonate: Listed

U.S.A management information (OSHA Regulation) : Not regulated

U.S.A management information (CERCLA Regulation) :

- Copper: 5000lb
- Nickel: 100lb

U.S.A management information (EPCRA 302 Regulation) : Not regulated

U.S.A management information (EPCRA 304 Regulation) : Not regulated

U.S.A management information (EPCRA 313 Regulation) :

- Lithium nickel cobalt aluminum oxide: Regulated (Nickel Compounds) (Cobalt compounds)
- Copper: Regulated
- Aluminum(metal) : Regulated (fume or dust)
- Nickel: Regulated
- Lithium carbonate: Regulated

Other regulations:

Substance of Roterdame Protocol : Not regulated

Substance of Stockholme Protocol : Not regulated

Substance of Montreal Protocol : Not regulated

15.2 Chemical safety assessment :

- No chemical safety assessment has been carried out for this product by the supplier.

Section XVI – OTHER INFORMATION EU

Product safety data sheet for INR21700-50U prepared in accordance with Regulation (EU) 2020/878 (REACH), Annex II, and OSHA 29 CFR 1910.1200

16.1 Indication of changes

Date Updated : 28 May 2024

Version : Rev. 00

16.2 Abbreviations and acronyms

ACGIH = American Conference of Government Industrial Hygienists
CLP = Classification Labelling Packaging Regulation ; Regulation (EC) No 1272/2008
CAS No. = Chemical Abstracts Service number
DMEL = Derived Minimal Effect Levels
DNEL = Derived No Effect Level
EC Number = EINECS and ELINCS Number (see also EINECS and ELINCS)
EU = European Union
IARC = International Agency for Research on Cancer
ISHL = Industrial Safety & Health Law
NIOSH = National Institute for Occupational Safety & Health
NTP = National Toxicology Program
OSHA = European Agency for Safety and Health at work
PBT = Persistent, Bioaccumulative and Toxic substance
PNEC(s) = Predicted No Effect Concentration(s)
REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 453/2010
STP = Sewage Treatment Plant
SVHC = Substances of Very High Concern
vPvB = Very Persistent and Very Bioaccumulative
UN = United Nations
MARPOL = International Convention for the Prevention of Pollution from Ships (IMO)
IBC = Intermediate Bulk Container
CERCLA = Comprehensive Environmental Response, Compensation & Liability Act (US)
EPCRA = Emergency Planning and Community Right-to-Know Act (US)
EINECS = European Inventory of Existing Commercial chemical Substances
ELINCS = European List of Notified Chemical Substances

16.3 Key literature reference and sources for data :

U.S. National library of Medicine (NLM) Hazardous Substances Data Bank (HSDB)
LookChem; http://www.lookchem.com/
IUCLID: http://ecb.jrc.ec.europa.eu/IUCLID-DataSheets/7631905.pdf
CHRIP(Chemical Risk Information Platform)
EPISUITE v4.11; http://www.epa.gov/opt/exposure/pubs/episuitedl.html
The Chemical Database -The Department of Chemistry at the University of Akron; http://ull.chemistry.uakron.edu/erd/
ECOTOX: http://cfpub.epa.gov/ecotox/
International Chemical Safety Cards (ICSC): http://www.nihs.go.jp/ICSC/
National Chemical Information System (http://ncis.nier.go.kr)
Korea Dangerous Material Inventory Management System (http://hazmat.nema.go.kr)

REACH information on registered substances; https://echa.europa.eu/information-on-chemicals/registered-substances
EU CLP; https://echa.europa.eu/information-on-chemicals/cl-inventory-database
NIOSH Pocket Guide; http://www.cdc.gov/niosh/npg/npgdcas.html
IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; http://monographs.iarc.fr
National Toxicology Program; http://ntp.niehs.nih.gov/results/dbsearch/
TOMES-LOLI®; http://www.rightanswerknowledge.com/loginRA.asp
UN Recommendations on the transport of dangerous goods
American Conference of Governmental Industrial Hygienists TLVs and BEIs.

16.4 Classification and procedure used to derive the classification for mixtures according to Regulation(EC) 1272/2008(CLP) :

Classification according to Regulation (EC) 1272/2008	Classification procedure
Not classified	Not applicable

16.5 Relevant H-statements : Not applicable

16.6 Training advice :

- Do not handle until all safety precautions have been read and understood.

16.7 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 uarantee 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.