

## 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

ICR18650-22F

#### Use of the substance/preparation

Lithium-Ion battery

#### Manufacturer

SAMSUNG SDI Co., LTD

#### Address

HQ: 150-20, Gongse-ro, 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: 2.2 Ah

Wh rating: 7.92 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
24937-79-9	1,1-Difluoroethene homopolymer	< 1%
96-49-1	1,3-Dioxolan-2-one	< 2%
25640-14-6	1,4-Benzenedicarboxylic acid dimethyl ester polymer with 1,4-cyclohexanedimethanol and 1,2-ethanediol	< 1%
36619-23-5	1,4-Benzenedicarboxylic acid, dimethyl ester, polymer with 1,3-propanediol	< 1%
25038-81-7	1H,3H-Benzo[1,2-c:4,5-c']difuran-1,3,5,7-tetrone polymer with 4,4'-oxybis[benzenamine]	< 1%
9003-07-0	1-Propene homopolymer	< 1%
9010-94-0	2-Methyl-2-propenoic acid methyl ester polymer with 1,3-butadiene, ethenylbenzene and 2-propenenitrile	< 1%
35239-19-1	2-Propenoic acid polymer with butyl 2-propenoate, ethenyl acetate and 2-ethylhexyl 2-propenoate	< 1%
114435-02-8	4-Fluoro-1,3-dioxolan-2-one	< 1%
24937-78-8	Acetic acid ethenyl ester polymer with ethene	< 1%
7429-90-5	Aluminium	< 5%
110-61-2	Butanedinitrile	< 1%
1333-86-4	Carbon black	< 1%
9004-32-4	Cellulose, carboxymethyl ether, sodium salt	< 1%
7440-47-3	Chromium	< 1%
7440-50-8	Copper	< 8%
616-38-6	dimethyl carbonate	< 8%
623-53-0	Ethyl methyl carbonate	< 1%
7782-42-5	Graphite	< 20%
7439-89-6	Iron	< 15%
554-13-2	lithium carbonate	< 1%
21324-40-3	lithium hexafluorophosphate(1-)	< 2%
182442-95-1	Lithium Nickel Cobalt Manganese Oxide	< 35%
14283-07-9	lithium tetrafluoroborate, anhydrous	< 1%



7439-95-4	Magnesium	< 1%
7439-96-5	Manganese	< 1%
7440-02-0	Nickel	< 2%
24968-12-5	poly(1,4-butylene terephthalate)	< 1%
9002-88-4	Polyethylene	< 3%
9003-07-04	Polypropylene	< 1%
7440-21-3	Silicon	< 1%
14807-96-6	Talc (Mg <sub>3</sub> H <sub>2</sub> (SiO <sub>3</sub> ) <sub>4</sub> )	< 1%
13463-67-7	titanium dioxide	< 1%
4427-96-7	Vinyl Ethylene Carbonate	< 1%

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**

<b>Ingredient</b>	<b>Risk Codes</b>	<b>Safety Description</b>	<b>Hazard</b>	<b>Exposure Controls/Personal Protection</b>
Cobalt oxide	R22;R43; R50/53	S24;S37;S60;S61	Xn(Harmful) N (Dangerous for	0.1 mg/m3 (TWA)



			the environment)	
Manganese (VI) oxide	R20/22	S25	Xn(Harmful)	<b>Airborne Exposure Limits:</b> - OSHA Permissible Exposure Limit (PEL): 5 mg/m3 Ceiling for manganese compounds as Mn - ACGIH Threshold Limit Value (TLV): 0.2 mg/m3 (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/m3 (TWA). For Nickel, Elemental / Metal: - ACGIH Threshold Limit Value (TLV) - 1.5 mg/m3 (TWA), A5 - Not suspected as a human carcinogen. For Nickel, Insoluble Compounds, as Ni: - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m3 (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/m3
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/m3 (TWA) total dust and 5 mg/m3 (TWA) repairable fraction for Aluminum metal as Al -ACGIH Threshold Limit Value (TLV): 10 mg/m3 (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:	Insoluble
Ignition temperature:	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**

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

- The International Civil Aviation Organization (ICAO) Technical Instructions, Packing Instruction 965, Section I B or II (2015-2016 Edition),
- The International Air Transport Association (IATA) Dangerous Goods Regulations, Packing Instruction 965, Section I B or II (56th Edition, 2015)
- The International Maritime Dangerous Goods (IMDG) Code (2014 Edition), [Special provision 188, 230]
- US Hazardous Materials Regulations 49 CFR(Code of Federal Regulations) Sections 173.185 Lithium batteries and cells,
- The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria 38.3 Lithium batteries, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type (latest version is Revision 5, Amendment 2)
- UN No. 3480

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

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.

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

Manual of Test and Criteria (38.3 Lithium battery)		Test Results	Remark
No	Test item		
T1	Altitude Simulation	Pass	
T2	Thermal Test	Pass	
T3	Vibration	Pass	
T4	Shock	Pass	
T5	External Short Circuit	Pass	
T6	Impact/Crush	Pass	
T7	Overcharge	Pass	For pack and single cell battery only
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.

## SAFETY DATA SHEET

According to HCS-2012 APPENDIX D to §1910.1200

### 1. Identification

#### (1) Product Identifier

Product Name : Lithium ion cylindrical battery  
Product Model : INR18650B4

#### (2) Other Means of Identification

Product Description : 18650 2.6Ah

#### (3) Recommended Use and Restriction

Recommended Use : Laptop computer, Bluetooth speaker, Powerbank and other portable electronic products

Restriction on Use : No information available

#### (4) Manufacturer

LG Chemical Ltd.  
LG Twin Tower Youi-Daero 128, Youngdeungpo-Ku  
Seoul, Korea  
Postal Code : 07336

#### (5) Emergency Telephone Number

82-42-866-2805

### 2. Hazards Identification

#### (1) Classification of the Chemical

The battery is considered as an article, and this product is not classified as hazardous.

**(2) Label Elements**

Pictogram(s)	: No pictogram is used.
Signal word	: No signal word is used.
Hazard statements	: Not classified
Precautionary statements	: Not classified

**(3) Description of Any Hazards Not Otherwise Classified**

Do not dismantle, open or shred the battery. The ingredients contained within could be harmful.

**(4) Ingredient with Unknown Acute Toxicity**

No information available

**3. Composition / Information on Ingredients**

Hazardous Ingredients	%	CAS Number
Nickel compound	0-25	1313-99-1
Manganese compound	0-15	1313-13-9
Cobalt compound	4-50	1307-96-6
Styrene-Butadiene-Rubber	<1	27288-99-9
Polyvinylidene Fluoride (PVDF)	<5	24937-79-9
Aluminum Foil	2-10	7429-90-5
Copper Foil	2-10	7440-50-8
Graphite	10-30	7782-42-5
Electrolyte (Ethylene carbonate)	10-20	96-49-1
Lithium hexafluorophosphate	<5	21324-40-3
Stainless steel, Nickel and inert materials	Remainder	N/A

**4. First Aid Measures**

**The hazardous components of this battery are contained within a sealed unit. If exposure to internal materials within battery due to damaged outer casing, the following actions are recommended.**

**Inhalation**

Leave area immediately and seek medical attention.

**Eye contact**

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

**Skin contact**

Wash area thoroughly with soap and water and seek medical attention.

**Ingestion**

Get medical attention immediately.

**5. Fire Fighting Measures****(1) General Hazard**

Battery is not flammable but internal organic material will burn if the battery is incinerated. Combustion products include, but are not limited to hydrogen fluoride, carbon monoxide and carbon dioxide.

**(2) Suitable Extinguishing Media**

Use extinguishing media suitable for the materials that are burning.

: Water, Carbon dioxide, Dry Chemical, Foam, etc.

**(3) Special Firefighting Instructions**

If possible, remove battery(s) from fire fighting area. If heated above 125°C, battery(s) may explode/vent.

**(4) Firefighting Equipment**

Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.

**6. Accidental Release Measures****(1) Personal Precautions, Protective Equipment and Emergency Procedures**

As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed areas before entering. Wear adequate personal protective equipment.

## **(2) Methods and Materials for Containment and Cleaning Up**

Evacuate spill area immediately and remove sources of ignition. Do NOT touch spilled material. Cleanup personnel must be trained in the safe handling of this product. Spills may be absorbed on non-reactive absorbents such as vermiculite. Place batteries into individual plastic bags and then place into appropriate containers and close tightly for disposal. Ensure that cleanup procedures do not expose spilled material to any moisture. Immediately transport closed containers outside. Lined steel drums are suitable for storage of damaged cells or batteries until proper disposal can be arranged.

## **7. Handling and Storage**

### **(1) Precautions for Safe Handling**

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

### **(2) Cautions for Safe Storage, Including Any Incompatibilities**

Store in a dry and cool (eg. room temperature (approx. 20°C)) place 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**

### **(1) Exposure Limit Value**

Airborne exposures to hazardous substances are not expected when the batteries are used for their intended purposes. Exposure standards are not applicable to the sealed articles.

### **(2) Engineering Controls**

Special ventilation is not required when using these products in normal use scenarios. Ventilation is required if there is leakage from the battery.

### (3) Individual Protection Measure

**Eye and Face protection:** Eye protection is not required when handling batteries during normal use. Wear safety glasses/goggles if handling a leaking or ruptured battery.

**Skin (Hand) protection:** Hand protection is not required when handling the cell or battery during normal use. PVC gloves are recommended when dealing with a leaking or ruptured battery.

**Foot protection :** Steel toed shoes recommended for large container handling.

**Skin (clothing) protection:** Skin protection is not required when handling the battery during normal use. Wear long sleeved clothing to avoid skin contact if handling a leaking or ruptured battery. Soiled clothing should be washed with detergent prior to re-use.

**Respiratory protection:** During routine operation, a respirator is not required. However, if dealing with an electrolyte leakage and irritating vapors are generated, an approved half face inorganic vapor and gas/acid/particulate respirator is required. SCBA required in the event of a fire.

**Other Protective Equipment:** Have a safety shower or eye wash station readily available

## 9. Physical and Chemical Properties

State	Solid
Odor	N/A
pH	N/A
Vapor pressure	N/A
Vapor density	N/A
Boiling point	N/A
Solubility in water	Insoluble
Specific gravity	N/A
Density	N/A

## 10. Stability and Reactivity

### (1) Reactivity

None during normal operating or handling conditions

### (2) Chemical Stability

Stable under normal condition

### (3) Possibility of Hazardous Reactions

No hazardous reactions known

### (4) Conditions To Avoid

Avoid exposure to heat and open flame. Do not puncture, crush or incinerate.

### (5) Incompatible Materials

None during normal operation

Avoid exposure to heat, open flame, and corrosives.

### (6) Hazardous Decomposition Products

None during normal operating conditions

If batteries are opened, hydrogen fluoride and carbon monoxide may be released.

## 11. Toxicological Information

### (1) Information on toxicological effects

The hazardous components of the batteries are contained within a sealed unit. Under recommended use conditions, the electrode materials and liquid electrolyte are non-reactive provided that the battery integrity remains and the seals remain intact. The potential for exposure should not exist unless the battery leaks, is exposed to high temperature or is mechanically, electrically or physically abused/damaged.

The following toxicology data are in respect to if a person comes into contact with the electrolyte.

**Swallowed :** The electrolyte contained within the battery is a corrosive liquid. Ingestion of this electrolyte would be harmful. Swallowing may result in nausea, vomiting, diarrhea, abdominal pain and chemical burns to the gastrointestinal tract. During normal usage ingestion should not be a means of exposure.

**Eye:** The electrolyte contained within the battery is a corrosive liquid and it is expected that it would cause irreversible damage to the eyes. Contact may cause corneal burns. Effects may be slow to heal after eye contact. Correct handling procedures incorporating appropriate eye protection should minimize the risk of eye irritation.

**Skin:** The electrolyte contained within the battery is a corrosive liquid and it is expected that it would cause skin burns or severe irritation to the skin if not washed off immediately. Correct handling procedures should minimize the risk of skin irritation. People with pre-existing skin conditions, such as dermatitis, should take extreme care so as not to exacerbate the condition.

**Inhalation:** Inhalation of vapors from a leaking battery is expected to cause severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.

## (2) Information on Toxicological Characteristics

This product does not elicit toxicological properties during routine handling and use. If the batteries are opened through misuse or damage, discard immediately. Internal components of battery are irritants and sensitizers

Acute toxicity	: No data available
Skin corrosion/irritation	: No data available
Serious eye damage/irritation	: No data available
Respiratory sensitization	: No data available
Skin sensitization	: No data available
Carcinogenicity	: No data available
Germ Cell Mutagenicity	: No data available
Reproductive Toxicity	: No data available
STOT-Single Exposure	: No data available
STOT-Repeated Exposure	: No data available
Aspiration Hazard	: No data available



## 12. Ecological Information

### (1) Ecotoxicity

No ecological information available

### (2) Persistence and Degradability

No ecological information available

### (3) Bioaccumulative Potential

No ecological information available

### (4) Mobility in Soil

No ecological information available

### (5) Other Adverse Effects

No ecological information available

## 13. Disposal Considerations

Dispose of according to all federal, state, and local regulations.

## 14. Transport Information

Lithium batteries are classified in Class 9 – Miscellaneous dangerous goods as:

- UN 3480, Lithium ion batteries
- UN 3481, Lithium ion batteries contained in equipment; or
- UN 3481, Lithium ion batteries packed with equipment.

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

- The International Civil Aviation Organization (ICAO) Technical Instructions,
- The International Air Transport Association (IATA) Dangerous Goods Regulations

- The International Maritime Dangerous Goods (IMDG) Code,
- US Hazardous Materials Regulations 49 CFR(Code of Federal Regulations) Sections 173-185 Lithium batteries and cells,
- The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria 38.3 Lithium batteries,

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

Each cell or battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3;

## 15. Regulatory Information

This product is not hazardous under the criteria of the Federal Occupational Safety and Health Administration(OSHA) Hazard Communication Standard.(29 CFR 1910.1200)

Hazardous

Non-hazardous

## 16. Other Information

### (1) Preparation and Revision Information

Date of previous revision : 12/01/2016  
Date of this revision : 05/01/2017  
Revision Number : Rev 1.0

**(2) Disclaimer**

The information in this SDS is provided all the relevant data fully and truly. However, the information is provided without any warranty on their absolute extensiveness and accuracy. This SDS was prepared to provide safety preventive measures for the users who have got professional training. The personal user who obtained this SDS should make independent judgment for the applicability of this SDS under special conditions. In these special cases, we do not assume responsibility for the damage.

----- --End of the SDS -----