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# **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 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.

# Commercial product name

Model Name

# Use of the substance/preparation

Lithium-ion batteries

#### **Synonyms**

Lithium-ion Pack, Lithium-ion Battery, Li-Ion Pack, Li-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: x.x V Rated Capacity: x.xxx Ah Wh rating: x.xx 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.

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### 2. Hazards Identification

## 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.

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### **Hazard Summary**

**Physical hazards:** Not classified for physical hazards. **Health hazards:** Not classified for health hazards.

**Environmental hazards:** Not classified for hazards to the environment.

Specific hazards: Exposure to contents of an open or damaged cell or battery: contact with this material will

cause burns to the skin, eyes and mucous membranes. May cause sensitization by skin contact.

Main Symptoms: Symptoms include itching, burning, redness and tearing.

### **Hazardous Materials Information Label (HMIS)**

Health: 0 Flammability: 1 Physical Hazard: 0

# **NFPA Hazard Ratings**

Health: 0 Flammability: 1

Reactivity: 0 Unique Hazard:

#### Labelling

If the cell or battery is compromised and starts to leak, based upon the battery ingredients, the contents are classified as Hazardous

# Symbol:



Signal word: Danger

# **GHS** precautionary statements

P102: Keep out of reach of children.

P103: Read label prior to use.

Precautionary
Statement(s)
Prevention
Preven

P234: Keep only in original container. P254: Wash hands thoroughly after handling.

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Response (If cell/battery leaks)	P260: Do not breathe vapor or spray. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301/330/331: IF SWALLOWED: Rinse mouth. DO NOT induce vomiting. P303/361/353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P304/340: If INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305/351/338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310: Immediately call a POISON CENTER or doctor/physician. P363: Wash contaminated clothing before reuse. P370: In case of fire: Use carbon dioxide, dry chemical or water extinguisher.
Storage (Store as indicated in Section 7)	P402: Store in a dry place. P405: Store locked up. P410: Protect from sunlight.
Disposal	P406: Store any spilled/leaking electrolyte material in a corrosive resistant container with a resistant inner liner. P501: Dispose of batteries in accordance with applicable hazardous waste regulations.

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## 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.

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# 3. Composition/information on ingredients

# **Hazardous components**

	Chemical Name	CAS No.	*Mass range in cell (g/g %)
Electrolyte	Contains Electrolyte salt and solvents.		5-20
Electrolyte salt	Lithium hexafluorophosphate	21324-40-3	0.05-5
Electrolyte solvent	Includes one or more of the following; Ethelyne Carbonate Propylene Carbonate Diethyl Carbonate Ethyl propionate	96-49-1 108-32-7 105-58-8 105-37-3	5-20
PVDF	Polyvinylidenfluoride	24937-79-9	<1
Copper	Cu	7440-50-8	3-15
Aluminium	Al	7429-90-5	2-10
Cathode	Lithium cobalt oxide	12190-79-3	20-50
Anode	Graphite	7782-42-5	10-30
Steel, Nickel, and inert components		Various	Balance

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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.

# 4. First Aid Measures

### **Description of first aid measures**

The hazardous components of this cell or battery are contained within a sealed unit. The following measures are only applicable if exposure has occurred to components when a cell or battery leaks, is exposed to high temperatures or is mechanically, electrically or physically abused/damaged. The hazardous contents are caustic alkaline electrolytes contained in cells with lithium metal oxide cathodes, graphite and carbon anodes and Polyvinylidenfluoride binders.

**Ingestion:** Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Quickly transport victim to an emergency care facility.

**EYE:** If eye contact with contents of an open cell occurs, immediately flush the contaminated eye(s) with water. Quickly transport victim to an emergency care facility.

Skin Contact: Immediately flush with water. If irritation or pain persists, seek medical attention.

**Inhalation:** Remove the patient from exposure into fresh air, seek medical attention.

# **PROTECTION FOR FIRST**

**AIDERS:** Do not enter corrosive vapor contaminated areas without a respirator or Self Contained Breathing Apparatus. Wear adequate personal protective equipment as indicated in Section 8.

**FIRST AID FACILITIES:** Eye wash bottle, fountain, safety showers or at least a source of running water are required in the area where the product is used.

#### Most important symptoms & effects, acute & delayed, caused by exposure:

**ACUTE:** The contents of the battery are rated as corrosive. Ingestion of the electrolyte could lead to severe gastrointestinal tract irritation with nausea, vomiting and potentially burns. Inhalation of vapors may lead to 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. Eye contact may lead to severe eye irritation

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or in worst case scenario irreversible damage and possible eye burns. Skin contact may lead to irritation and possible skin burns.

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**CHRONIC:** Skin contact may aggravate/exacerbate existing skin conditions, such as dermatitis. Chronic inhalation may lead to the same symptoms as listed for acute inhalation above.

#### Indication of any immediate medical attention and special treatment needed

**ADVICE TO DOCTOR:** Treat symptomatically if the person comes into contact with the corrosive electrolyte liquid contents of a damaged battery.

# 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, 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 as indicated in Section 8.

#### **Environmental precautions**

Absorb spilled material with non-reactive absorbent such as vermiculite, clay or earth. Prevent from migration into soil, sewers and natural waterways – inform local authorities if this occurs.

# Methods and material 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 cells or 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

## **Precaution for Handling**

Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble.

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Advice on protection against fire and explosion Keep away from open flames, hot surfaces and sources of ignition.

#### **Condition for storage**

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

### **Exposure Control Measures**

**Exposure Limit Values:** Airborne exposures to hazardous substances are not expected when the cells or batteries are used for their intended purposes. Exposure standards are not applicable to the sealed articles.

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**Biological Monitoring:** Not applicable. **Control Banding:** Not applicable.

Recommended monitoring procedures: Follow standard monitoring procedures.

Derived no-effect level (DNEL): Not applicable.

Derived minimal effect level (DMEL): Not applicable.

Predicted no-effect concentrations (PNECs): Not applicable.

#### **Engineering Controls**

**Engineering Controls:** Special ventilation is not required when using these products in normal use scenarios. Ventilation is required if there is leakage from the cell or battery.

#### **Individual Protection Measures**

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

**Skin (clothing) protection:** Skin protection is not required when handling the cell or battery during normal use. Wear long sleeved clothing to avoid skin contact if handling a leaking or ruptured cell or 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.

Thermal Protection: Not applicable.

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

<u>Hygiene Measures</u>: Do not eat, drink or smoke in work areas. Avoid storing food, drink or tobacco near the product. Practice and maintain good housekeeping.

**Environmental exposure controls:** Avoid release to the environment.

# 9. Physical and Chemical Properties

# <u>Appearance</u>

physical state,: Solid Color: Various Odor: Odorless

## Important health, safety and environmental information

Test method

pHValue: n.a. Flash point: n.a. Lower explosion limits: n.a.

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Vapour pressure:n.a.Density:n.a.Water solubility:InsolubleIgnition temperature:n.a.

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# 10. Stability and Reactivity

#### 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

# Information on toxicological effects:

The hazardous components of the cell or battery are contained within a sealed unit. 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 battery leaks, is exposed to high temperature or is mechanically, electrically or physically abused/damaged. The following toxicology data is in respect to if a person comes into contact with the electrolyte.

#### Acute Toxicity:

**Swallowed:** The electrolyte contained within the cell or 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 cell or 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 cell or 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.

**Inhaled:** Inhalation of vapors from a leaking cell or 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.

**Skin Corrosion/Irritation:** The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit Dermal Corrosivity/Irritation.

**Serious Eye Damage/Irritation:** The electrolyte contained within the cell or battery is classified as a corrosive liquid and is expected to exhibit serious Damage/Corrosivity.

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**Respiratory or Skin Sensitization:** The electrolyte contained within the cell or battery is not expected to be a skin sensitizer according to OECD test 406, based on the available data and the known hazards of the components. The electrolyte contained within the battery is not expected to be a respiratory tract sensitizer, based on the available data and the known hazards of the components.

**Germ Cell Mutagenicity:** The electrolyte contained within the cell or battery is not expected to be mutagenic according to test such as OECD tests 471, 475, 476, 478 and 479, based on the available data and the known hazards of the components.

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**Carcinogenicity:** Th electrolyte contained within the cell or battery is not expected to be a carcinogen. The cathode contains Cobalt and Nickel components. These components are classified as IARC 2B – possibly carcinogenic to humans, however they do not pose a threat when contained in the cell or battery sealed unit.

**Reproductive Toxicity:** The electrolyte contained within the cell or battery is not expected to be a reproductive hazard according to test such as OECD tests 414 and 421, based on the available data and the known hazards of the components.

**Specific Target Organ Toxicity (STOT) – Single Exposure:** The electrolyte contained within the cell or battery is corrosive and is expect to cause respiratory irritation by inhalation. Inhalation of vapors may lead to 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.

**Specific Target Organ Toxicity (STOT) – Repeated Exposure:** The cells or batteries are not expected to cause organ damage from prolonged or repeated exposure according to tests such as OECD tests 410 and 412, based on the available data and the known hazards of the components.

**Aspiration Hazard:** The cells or batteries are not classified as an aspiration hazard, based on the available data and the known hazards of the components. However, due to the corrosive nature of the product if swallowed, do NOT induce vomiting. If vomiting has occurred after ingestion the person should be observed to ensure that aspiration into the lungs has not occurred and assessed for chemical burns to the gastrointestinal and respiratory tracts.

# 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:

- UN No. 3480
- UN proper shipping name: Lithium Ion Batteries.
- Transportation hazard class 9
- Air PI 965 Section I B: Dangerous Goods
- Sea, Land, Air PI965 Section II: Non dangerous Goods

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- The International Civil Aviation Organization (ICAO) Technical Instructions, Packing Instruction 965, Section I B or II (2017-2018 Edition),
- The International Air Transport Association (IATA) Dangerous Goods Regulations, Packing Instruction 965, Section I B or II (58th Edition, 2017)
- The International Maritime Dangerous Goods (IMDG) Code [Special provision 188, 230, 384] (2016 Edition),

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- 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 6)

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 o	f Test and Criteria (38.3 Lithium batteries)	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

#### **Canadian Federal Regulations:**

These products have been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

WHMIS Classification: Not Controlled, manufactured article.

**New Substance Notification Regulations:** Lithium hexafluorophosphate is listed on the Non-Domestic Substance List (NDSL). All other ingredients in the product are listed, as required, on Canada's Domestic Substances List (DSL).

National Pollutant Release Inventory (NPRI) Substances: These products do not contain any NPRI chemicals.

# **United States Federal and State Regulations:**

**TSCA Status:** All ingredients in these products are listed on the TSCA inventory.

**OSHA:** These products do not meet criteria as per Part 1910.1200, manufactured article.

SARA EPA Title III: None. Sec. 302/304: None.

Sec. 311/312: None. Sec. 313: None. CERCLA RQ: None.

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### **Australia and New Zealand**

**SUSMP:** Not applicable

AICS: All ingredients are on the AICS list. HSNO Approval number: Not applicable

**HSNO Group Title:** Not applicable

NOHSC:10008 Risk Phrases: R34 - Causes Burns.

NOHSC:1008 Safety Phrases:

S1 - Keep locked up.

S2 - Keep out of reach of children.

S23 - Do not breathe vapor.

S24/25 - Avoid contact with skin and eyes.

S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S27/28 – After contact with skin, take off immediately all contaminated clothing and wash immediately with plenty of water.

S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

S56 - Dispose of this material and its container at hazardous waste or special waste collection point.

S62 - If swallowed, DO NOT induce vomiting: seek medical advice immediately and show this container or label.

S64 – If swallowed, rinse mouth with water (Only if the person is conscious).

### **EC Classification for the Substance/Preparation:**

These products are not classified as hazardous according to Regulation (EC) No. 1272/2008. Keep out of the reach of children.

### **EU Restrictions on use:**

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended: Aluminium (CAS 7429-90-5)

### **Other EU Regulations**

This Safety Data Sheet complies with the requirements of Regulation (EC) No. 1907/2006.

# **Japanese Regulations**

Japanese Industrial Standards (JIS) JIS Z 7253:2012

Waste disposal and public cleaning law

Law for Promotion of Effective Utilization of Resources

# **Taiwanese Regulations**

Regulation of Labelling and Hazard Communication of Dangerous and Harmful Materials: Labeling requirements and other relevant provision of chemicals, this product is not classified as dangerous goods.

Toxic Chemicals Substance Control Law: Not Listed.

CNS 1030016 Safety of primary and secondary lithium cells and batteries during transport.

#### **Chinese Regulations**

General Rule for Classification and Hazard Communication of Chemicals (GB 13690-2009): Specifies the classification, labeling and hazard communication of chemicals in compliance with the GHS standard for chemical production sites and labeling of consumer goods.

General Rule for Preparation of Precautionary Labels for Chemicals (GB 15258-2009): Specifies the relevant application methods of precautionary labels for chemicals.

Safety Data Sheet for Chemical Products Content and Order of Sections (GB/T 16483-2008)

# 16. Other Information

### **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

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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.

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# DPN Table

→ DIN Tak									
04HHG	5Y4YV	C5501	FG447	JXFRP	NG011	RF961	UW284	X645M	YF093
04NW9	62VRR	C5503	FH1VR	JY316	NG988	RF970	VVTH9	X6825	YF097
09K6P	6HKFR	C6R6X	FM335	JY358	NH3H6	RG487	VVX2P	X741M	YM32M
0DNY0	6P147	C7785	FU272	JYPJ1	NJ644	RM661	W006C	X9WXK	YMYF6
0K619	6YTC2	C931N	FW301	K456N	NRJ6T	RM804	W0390	XC347	YP463
0U562	75WY2	CC980	G019Y	K751G	NT340	RTKDH	W1357	XG500	38CK3
0X297	77G21	CD442	G275K	K9XJR	NT394	T0489	W1950	XG536	0HWXD
1860G	7869G	CN7FG	G6M0W	KFHT8	NT395	T195H	W1GGM	XJDCH	FHHVX
1K090	7DWMT	CP284	G805H	KG875	NXND9	T5V0C	W341C	XRDW2	1C75X
1M235	7TMWG	CP289	GCJ48	KGNX1	P018K	T6474	W343C	Y0037	J5CG3
1NP0F	7XC9N	D04FV	GD786	KM760	P0383	T795R	W355R	Y0092	J654N
1NR9W	7XFJJ	D2335	GTVP0	KM904	P0981	TDC9N	W360P	Y0396	K714N
1P255	84KTX	D293K	GU500	KVG4M	P238F	TG226	W60YD	Y0397	N532P
1U516	854TJ	D5509	GXY73	M0270	P383H	TRJDK	W8H5Y	Y0398	N533P
21TTR	86NP1	D5652	H0630	M1RPP	P505M	U006C	WP193	Y0408	W602C
2K184	88JR6	D57NP	H1141	M2FVT	P6183	U0317	WR047	Y0410	H9929
2MTH3	8N884	D670H	H1M60	M6407	P878C	U1822	WRP9M	Y0413	21TTR
2T6K2	8P6X6	DC779	H2048	M6T48	PCV5M	U331C	X0056	Y0414	P70V5
2TMHN	8TYF7	DHYCM	H9929	M905P	PD3D2	U4976	X0350	Y0431	45NTH
2W244	8U443	DU163	HC287	M9758	PFF30	U5014	X0968	Y0449	88JR6
2X018	99JC0	DY373	HG181	MG827	PT436	U5869	X0971	Y0HGN	5F3F9
3F7FN	9F2JJ	F0D4C	HGDWX	MNYJT	PT653	U5881	X0973	Y1238	XRDW2
3X017	9J7MV	F1353	HK3RG	MP494	PW649	U5883	X0975	Y1512	G33TT
3X021	9JJGJ	F466C	HW896	MT193	PW773	U5884	X1570	Y271J	K9XJR
3VJJC	9K50T	F5076	HW898	MT277	PXD36	U5886	X1707	Y40R5	7W6K0
4J121	9P0W6	F5127	HXN3H	N0975	PYCT7	U600P	X413C	Y4466	Y758W
4K445	9U261	F5128	J1638	N0988	R2896	U6185	X415C	Y4502	9KH5H
4N384	9VJ64	F5186	J6FFM	N164G	R3902	U728H	X5309	Y4544	62VNH
5400K	C2072	F5192	J9838	N221R	R438C	UG260	X5330	Y4547	VJF0X
57VCF	C2074	F7W7V	JC308	N2750	R725C	UK716	X5644	Y5173	T8NH4
5CGM4	C2451	FC776	JG166	N573H	R839C	UM225	X602C	Y5332	2W3CR
5F3F9	C313K	FFXJ7	JG176	N853P	R841C	UM226	X6142	Y571H	T8NH4
5K498	C5448	6PHG8	JG768	N9406	2F8K3	DRTDW	CXF66	Y595M	N33WY
5WFK6	C5499	7YM07	JP7TX	GPHG8	G7GMT	C0MXV	9Y1JF	VXH62	VDYR8
2F93G	9783Y	1132N	VVMKC	86JK8	R5MD0	1KY05	179F8	3WKT0	62N2T
YGR2V	JKHC1	07G07	XKPD0	GR5D3	TWCPG	579TY	1W2Y2	W9FNJ	TXF9M
M7R96	MM4H1	098N0	257V0	92YR1	RFH3V	FDD57	0GFJ6	WH96V	VY9ND
7FR5J	J0HDW	2GXTM	6C0FN	M7R96	CV4PN	PGYK5	V6VMN	FC92N	PVHT1
GWV47	V4940	45N3J	MT31P	YWYV6	C4HCW	J9NH2	CYMGM		

# **Appendix**

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