

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## BATTERY LI-ION 18 V / 4,0 AH M-CUBE BASIC

Version	Revision Date:	SDS Number:	Date of last issue: 20.03.2019
2.0	10.01.2020	4088070-00002	Date of first issue: 20.03.2019

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### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1 Product identifier

Trade name : BATTERY LI-ION 18 V / 4,0 AH M-CUBE BASIC

Product code : 5704180000

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

Use of the Sub- : Battery  
stance/Mixture Article  
Professional use product

#### 1.3 Details of the supplier of the safety data sheet

Company : Adolf Wuerth GmbH & Co. KG  
Reinhold-Würth-Str. 12-17  
74653 Künzelsau

Telephone : +49 794015 0

Telefax : +49 794015 10 00

E-mail address of person : prodsafe@wuerth.com  
responsible for the SDS

#### 1.4 Emergency telephone number

+49 (0)6132 – 84463

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### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

##### Classification (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

#### 2.2 Label elements

##### Labelling (REGULATION (EC) No 1272/2008)

Not a hazardous substance or mixture.

##### Additional Labelling

EUH210 Safety data sheet available on request.

EUH208 Contains Nickel, Cobalt lithium dioxide, Lithium nickel dioxide. May produce an allergic reaction.  
Restricted to professional users.

#### 2.3 Other hazards

None known.

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### SECTION 3: Composition/information on ingredients

#### 3.2 Mixtures

##### Components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
Lithium nickel dioxide	12031-65-1 028-057-00-7	Resp. Sens. 1; H334 Skin Sens. 1; H317 Muta. 2; H341 Carc. 1A; H350i Repr. 1B; H360D STOT RE 1; H372 Aquatic Acute 1; H400 Aquatic Chronic 1; H410  M-Factor (Acute aquatic toxicity): 1 M-Factor (Chronic aquatic toxicity): 10	>= 20 - < 25
Lithium Manganese (III,IV) oxide	12057-17-9	STOT RE 2; H373 Aquatic Chronic 2; H411	>= 10 - < 20
Ethylene carbonate	96-49-1 202-510-0	Acute Tox. 4; H302 Eye Irrit. 2; H319 STOT RE 2; H373	>= 1 - < 10
Lithium hexafluorophosphate	21324-40-3 244-334-7	Acute Tox. 3; H301 Skin Corr. 1A; H314 Eye Dam. 1; H318 STOT RE 1; H372	>= 5 - < 10
Cobalt lithium dioxide	12190-79-3 235-362-0	Resp. Sens. 1B; H334 Muta. 2; H341 Carc. 1B; H350 Repr. 1B; H360F STOT RE 1; H372 Aquatic Chronic 2; H411	>= 2,5 - < 10
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). :			
N-Methyl-2-pyrrolidone	872-50-4 212-828-1 606-021-00-7	Skin Irrit. 2; H315 Eye Irrit. 2; H319 Repr. 1B; H360D STOT SE 3; H335	>= 0,3 - < 1

For explanation of abbreviations see section 16.

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### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

Protection of first-aiders	:	No special precautions are necessary for first aid responders.
If inhaled	:	Not applicable
In case of skin contact	:	Not applicable
In case of eye contact	:	Not applicable
If swallowed	:	Not applicable

#### 4.2 Most important symptoms and effects, both acute and delayed

Risks	:	May produce an allergic reaction.
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#### 4.3 Indication of any immediate medical attention and special treatment needed

Treatment	:	Treat symptomatically and supportively.
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### SECTION 5: Firefighting measures

#### 5.1 Extinguishing media

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO <sub>2</sub> ) Dry chemical
Unsuitable extinguishing media	:	None known.

#### 5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting	:	Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Metal oxides Cobalt compounds Fluorine compounds Oxides of phosphorus

#### 5.3 Advice for firefighters

Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment.
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do

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so.  
Evacuate area.

### SECTION 6: Accidental release measures

#### 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Follow safe handling advice and personal protective equipment recommendations.

#### 6.2 Environmental precautions

Environmental precautions : Discharge into the environment must be avoided.  
Prevent further leakage or spillage if safe to do so.  
Retain and dispose of contaminated wash water.  
Local authorities should be advised if significant spillages cannot be contained.

#### 6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Sweep up or vacuum up spillage and collect in suitable container for disposal.  
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.  
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

#### 6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

### SECTION 7: Handling and storage

#### 7.1 Precautions for safe handling

Technical measures : See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.

Local/Total ventilation : Use only with adequate ventilation.

Advice on safe handling : Avoid prolonged or repeated contact with skin.  
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment  
Keep away from water.  
Protect from moisture.  
Take care to prevent spills, waste and minimize release to the environment.

Hygiene measures : When using do not eat, drink or smoke.

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### 7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep in properly labelled containers. Store in accordance with the particular national regulations.

Advice on common storage : Do not store with the following product types:  
Strong oxidizing agents

Storage class (TRGS 510) : 11, Combustible Solids

### 7.3 Specific end use(s)

Specific use(s) : No data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Graphite	7782-42-5	AGW (Inhalable fraction)	10 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	2;(II)			
Further information	General dust value. For this substance no specific occupational exposure limit value is established, since the AGS does not yet have information regarding unspecific action on the respiratory organs in excess of the normal values., Commission for dangerous substances, Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission).			
		AGW (Alveolate fraction)	1,25 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	2;(II)			
Lithium nickel dioxide	12031-65-1	AGW (Inhalable fraction)	0,2 mg/m <sup>3</sup> (Lithium)	DE TRGS 900
Peak-limit: excursion factor (category)	1;(I)			
Further information	Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., The threshold value is based on the element content of the corresponding metal., When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
		AGW (Inhalable fraction)	0,03 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	8;(II)			
Further information	For nickel compounds classified as Carc 1A or 1B, see TRGS 910 and TRGS			

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	561. An assessment based on the AGW for nickel metal can be carried out if nickel metal only is present. If nickel-containing dusts are formed during activities in which only surface oxidation is to be controlled, they must be treated as nickel-metal-containing mixtures. When using thermal processes in the presence of oxygen, a formation of oxidic nickel compounds must always be assumed. This is the case, for example, in welding (electrodes or wire) and thermal cutting with or from alloys, in the metal injection of alloys, in the melting and casting of alloys, and in the grinding and separation of alloys with 'spark formation'. Further recommendations as well as examples of working methods, for which the AGW or the ERB can be used for assessment, are contained in the IFA workbook (code 0537)., The occupational medical-toxicological derivation of this value is based on a plausibility analysis. The values for respirable dust for nickel metal in TRGS 900 and for nickel compounds in TRGS 910 are to be considered., Commission for dangerous substances, The threshold value is based on the element content of the corresponding metal., When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child, Substance sensitizing through the skin			
		Acceptable concentration (Alveolate part)	6 microgram per cubic meter (Nickel)	DE TRGS 910
Further information	Acceptable concentration associated with the risk 4:10000, The concentrations apply to the element of the metal, For nickel metal there is value related to the inhalable and respirable dust fraction; for nickel compounds a value related to the inhalable dust fraction is specified, see TRGS 900., The tolerance concentration is determined according to point 3.2.1 because of a non-cancer-producing effect. In the event of an excess, the same measures as for exceeding the AGW apply.			
		Tolerable concentration (Alveolate part)	6 microgram per cubic meter (Nickel)	DE TRGS 910
Peak-limit: excursion factor (category)	8 - Excursion factor according to Number 3.2.5			
Further information	The concentrations apply to the element of the metal, For nickel metal there is value related to the inhalable and respirable dust fraction; for nickel compounds a value related to the inhalable dust fraction is specified, see TRGS 900., The tolerance concentration is determined according to point 3.2.1 because of a non-cancer-producing effect. In the event of an excess, the same measures as for exceeding the AGW apply.			
Lithium Manganese (III,IV) oxide	12057-17-9	AGW (Inhalable fraction)	0,2 mg/m <sup>3</sup> (Manganese)	DE TRGS 900
Peak-limit: excursion factor (category)	8;(II)			
Further information	Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., The threshold value is based on the element content of the corresponding metal., When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
		AGW (Alveolate fraction)	0,02 mg/m <sup>3</sup> (Manganese)	DE TRGS 900
Peak-limit: excursion	8;(II)			

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Exposure factor (category)				
		AGW (Inhalable fraction)	0,2 mg/m <sup>3</sup> (Lithium)	DE TRGS 900
Peak-limit: excursion factor (category)	1;(I)			
		TWA (inhalable fraction)	0,2 mg/m <sup>3</sup> (Manganese)	2017/164/EU
Further information	Indicative			
		TWA (Respirable fraction)	0,05 mg/m <sup>3</sup> (Manganese)	2017/164/EU
Aluminium	7429-90-5	AGW (Inhalable fraction)	10 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	2;(II)			
Further information	General dust value. For this substance no specific occupational exposure limit value is established, since the AGS does not yet have information regarding unspecific action on the respiratory organs in excess of the normal values., Commission for dangerous substances, Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission).			
		AGW (Alveolate fraction)	1,25 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	2;(II)			
Polyethylene	9002-88-4	AGW (Inhalable fraction)	10 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	2;(II)			
Further information	General dust value. For this substance no specific occupational exposure limit value is established, since the AGS does not yet have information regarding unspecific action on the respiratory organs in excess of the normal values., Commission for dangerous substances, Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission).			
		AGW (Alveolate fraction)	1,25 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	2;(II)			
Lithium hexafluorophosphate	21324-40-3	AGW (Inhalable fraction)	1 mg/m <sup>3</sup> (Fluorine)	DE TRGS 900
Peak-limit: excursion factor (category)	4;(II)			
Further information	Senate commission for the review of compounds at the work place dangerous			

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	for the health (MAK-commission)., Skin absorption, When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
		TWA	2,5 mg/m <sup>3</sup> (Fluorine)	2000/39/EC
Further information	Indicative			
Cobalt lithium dioxide	12190-79-3	AGW (Inhalable fraction)	0,2 mg/m <sup>3</sup> (Lithium)	DE TRGS 900
Peak-limit: excursion factor (category)	1;(I)			
Further information	Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., The threshold value is based on the element content of the corresponding metal., When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
		Acceptable concentration (Alveolate part)	0,5 microgram per cubic meter (Cobalt)	DE TRGS 910
Further information	Acceptable concentration associated with the risk 4:10000, The concentrations apply to the element of the metal			
		Tolerable concentration (Alveolate part)	5 microgram per cubic meter (Cobalt)	DE TRGS 910
Peak-limit: excursion factor (category)	8 - Excursion factor according to Number 3.2.5			
Further information	The concentrations apply to the element of the metal			
N-Methyl-2-pyrrolidone	872-50-4	TWA	10 ppm 40 mg/m <sup>3</sup>	2009/161/EU
Further information	Identifies the possibility of significant uptake through the skin, Indicative			
		STEL	20 ppm 80 mg/m <sup>3</sup>	2009/161/EU
		AGW (Vapour)	20 ppm 82 mg/m <sup>3</sup>	DE TRGS 900
Peak-limit: excursion factor (category)	2;(I)			
Further information	Senate commission for the review of compounds at the work place dangerous for the health has also established a BEI-value for the same OEL value in the 'MAK- and BAT-value list', Commission for dangerous substances, Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., European Union (The EU has established a limit value: deviations in value and peak limit are possible), Sum of vapor and aerosols., Skin absorption, When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			

**Occupational exposure limits of decomposition products**

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Phosphoric acid	7664-38-2	TWA	1 mg/m <sup>3</sup>	2000/39/EC



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Further information	Indicative			
		STEL	2 mg/m3	2000/39/EC
		AGW (Inhalable fraction)	2 mg/m3	DE TRGS 900
Peak-limit: excursion factor (category)	2;(I)			
Further information	Commission for dangerous substances, Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., European Union (The EU has established a limit value: deviations in value and peak limit are possible), When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
Hydrofluoric acid	7664-39-3	TWA	1,8 ppm 1,5 mg/m3	2000/39/EC
Further information	Indicative			
		STEL	3 ppm 2,5 mg/m3	2000/39/EC
		AGW	1 ppm 0,83 mg/m3	DE TRGS 900
Peak-limit: excursion factor (category)	2;(I)			
Further information	Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., European Union (The EU has established a limit value: deviations in value and peak limit are possible), Skin absorption, When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
Lithium fluoride	7789-24-4	AGW (Inhalable fraction)	1 mg/m3 (Fluorine)	DE TRGS 900
Peak-limit: excursion factor (category)	4;(II)			
Further information	Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., Skin absorption, When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
		AGW (Inhalable fraction)	0,2 mg/m3 (Lithium)	DE TRGS 900
Peak-limit: excursion factor (category)	1;(I)			
Further information	Senate commission for the review of compounds at the work place dangerous for the health (MAK-commission)., The threshold value is based on the element content of the corresponding metal., When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
		TWA	2,5 mg/m3 (Fluorine)	2000/39/EC
Further information	Indicative			

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### Biological occupational exposure limits

Substance name	CAS-No.	Control parameters	Sampling time	Basis
Lithium hexafluorophosphate	21324-40-3	fluoride (Fluorine): 7 mg/g Creatinine (Urine)	Immediately after exposure or after working hours	TRGS 903
		fluoride (Fluorine): 4 mg/g Creatinine (Urine)	Before next shift	TRGS 903
N-Methyl-2-pyrrolidone	872-50-4	5-Hydroxy-N- methyl-2- pyrrolidone: 150 mg/l (Urine)	Immediately after exposure or after working hours	TRGS 903

### Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
Aluminium	Workers	Inhalation	Long-term local effects	3,72 mg/m3
	Consumers	Ingestion	Long-term systemic effects	3,95 mg/kg bw/day
Copper	Consumers	Inhalation	Acute systemic effects	20 mg/m3
	Consumers	Skin contact	Acute systemic effects	273 mg/kg bw/day
	Workers	Skin contact	Long-term systemic effects	137 mg/kg bw/day
	Workers	Inhalation	Acute systemic effects	20 mg/m3
	Workers	Skin contact	Acute systemic effects	273 mg/kg bw/day
	Consumers	Skin contact	Long-term systemic effects	137 mg/kg bw/day
N-Methyl-2-pyrrolidone	Workers	Inhalation	Long-term systemic effects	14,4 mg/m3
	Workers	Inhalation	Long-term local effects	40 mg/m3
	Workers	Skin contact	Long-term systemic effects	4,8 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	3,6 mg/m3
	Consumers	Inhalation	Long-term local effects	4,5 mg/m3
	Consumers	Skin contact	Long-term systemic effects	2,4 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	0,85 mg/kg bw/day
Graphite	Consumers	Inhalation	Long-term local effects	0,3 mg/m3
	Consumers	Ingestion	Long-term systemic effects	813 mg/kg bw/day
	Workers	Inhalation	Long-term local effects	1,2 mg/m3

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Ethylene carbonate	Workers	Inhalation	Long-term systemic effects	15 mg/m3
	Workers	Skin contact	Long-term systemic effects	4,3 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	3,7 mg/m3
	Consumers	Skin contact	Long-term systemic effects	2,1 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	2,1 mg/kg bw/day
Iron	Workers	Inhalation	Long-term local effects	3 mg/m3
	Consumers	Inhalation	Long-term local effects	1,5 mg/m3
	Consumers	Ingestion	Long-term systemic effects	0,71 mg/kg bw/day
Lithium hexafluorophosphate	Workers	Inhalation	Long-term systemic effects	0,931 mg/m3
	Workers	Skin contact	Long-term systemic effects	0,133 mg/kg bw/day
Cobalt lithium dioxide	Workers	Inhalation	Long-term local effects	0,0664 mg/m3
	Consumers	Inhalation	Long-term local effects	0,0105 mg/m3
	Consumers	Ingestion	Long-term systemic effects	0,0495 mg/kg bw/day
Dimethyl carbonate	Workers	Inhalation	Long-term systemic effects	17,2 mg/m3
	Workers	Inhalation	Acute systemic effects	57 mg/m3
	Workers	Skin contact	Long-term systemic effects	5 mg/kg bw/day
	Workers	Inhalation	Acute local effects	57 mg/m3
	Workers	Skin contact	Acute systemic effects	66,7 mg/kg bw/day
	Workers	Skin contact	Acute local effects	17,7 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	4,4 mg/m3
	Consumers	Inhalation	Acute systemic effects	42,5 mg/m3
	Consumers	Inhalation	Acute local effects	42,5 mg/m3
	Consumers	Skin contact	Long-term systemic effects	2,5 mg/kg bw/day
	Consumers	Skin contact	Acute systemic effects	33,3 mg/kg bw/day
	Consumers	Skin contact	Acute local effects	8,9 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	2,5 mg/kg bw/day
	Consumers	Ingestion	Acute systemic effects	50 mg/kg bw/day

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Substance name	Environmental Compartment	Value
Aluminium	Sewage treatment plant	20 mg/l
Copper	Fresh water	7,8 µg/l
	Marine water	5,2 µg/l
	Sewage treatment plant	230 µg/l
	Fresh water sediment	87 mg/kg
	Marine sediment	676 mg/kg
	Soil	65 mg/kg
N-Methyl-2-pyrrolidone	Fresh water	0,25 mg/l
	Freshwater - intermittent	5 mg/l
	Marine water	0,025 mg/l
	Sewage treatment plant	10 mg/l
	Fresh water sediment	1,09 mg/kg dry weight (d.w.)
	Marine sediment	1,09 mg/kg dry weight (d.w.)
	Soil	0,07 mg/kg dry weight (d.w.)
Ethylene carbonate	Fresh water	5,9 mg/l
	Intermittent use/release	59 mg/l
	Marine water	0,59 mg/l
	Marine water - intermittent	0,059 mg/l
	Fresh water sediment	28,3 mg/kg dry weight (d.w.)
	Marine sediment	2,83 mg/kg dry weight (d.w.)
	Soil	2,2 mg/kg dry weight (d.w.)
Lithium hexafluorophosphate	Fresh water	0,31 mg/l
	Marine water	0,031 mg/l
	Intermittent use/release	0,68 mg/l
	Sewage treatment plant	48 mg/l
	Fresh water sediment	7,73 mg/kg dry weight (d.w.)
	Marine sediment	1,55 mg/kg dry weight (d.w.)
	Soil	13,5 mg/kg dry weight (d.w.)
Cobalt lithium dioxide	Fresh water	0,0006 mg/l
	Marine water	0,00236 mg/l
	Sewage treatment plant	0,37 mg/l
	Fresh water sediment	9,5 mg/kg dry weight (d.w.)
	Marine sediment	9,5 mg/kg dry weight (d.w.)
	Soil	10,9 mg/kg dry weight (d.w.)
Dimethyl carbonate	Fresh water	0,5 mg/l
	Marine water	0,05 mg/l
	Intermittent use/release	1 mg/l
	Sewage treatment plant	188 mg/l

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### 8.2 Exposure controls

#### Engineering measures

Not applicable

#### Personal protective equipment

Eye protection : Not applicable

Hand protection

Remarks : not required

Skin and body protection : Not applicable

Respiratory protection : If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection. Equipment should conform to DIN EN 133

Filter type : Combined particulates, acidic gas/vapour and organic vapour type (AE-P)

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Appearance : solid

Colour : No data available

Odour : odourless

Odour Threshold : No data available

pH : No data available

Melting point/freezing point : No data available

Initial boiling point and boiling range : No data available

Flash point : Not applicable

Evaporation rate : Not applicable

Flammability (solid, gas) : Not classified as a flammability hazard

Upper explosion limit / Upper flammability limit : No data available

Lower explosion limit / Lower flammability limit : No data available

Vapour pressure : Not applicable

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Relative vapour density	:	Not applicable
Density	:	No data available
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	Not applicable
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

### 9.2 Other information

Particle size	:	No data available
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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Not classified as a reactivity hazard.

### 10.2 Chemical stability

Stable under normal conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions	:	Can react with strong oxidizing agents. Hazardous decomposition products will be formed upon contact with water or humid air.
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### 10.4 Conditions to avoid

Conditions to avoid	:	Exposure to moisture
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### 10.5 Incompatible materials

Materials to avoid	:	Oxidizing agents Water
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### 10.6 Hazardous decomposition products

Contact with water or humid air	:	Phosphoric acid Hydrofluoric acid Lithium fluoride
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### SECTION 11: Toxicological information

#### 11.1 Information on toxicological effects

Information on likely routes of exposure : Skin contact  
Ingestion  
Eye contact

##### Acute toxicity

Not classified based on available information.

##### Product:

Acute oral toxicity : Assessment: The substance or mixture has no acute oral toxicity  
Remarks: Based on bioavailability assessment according to 1.3.2.4.5 UN GHS/CLP article 12

Acute inhalation toxicity : Assessment: The substance or mixture has no acute inhalation toxicity, Not corrosive to the respiratory tract  
Remarks: Based on bioavailability assessment according to 1.3.2.4.5 UN GHS/CLP article 12

##### Components:

##### **Lithium nickel dioxide:**

Acute oral toxicity : LD50 (Rat): > 100 mg/kg  
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg  
Method: OECD Test Guideline 402  
Remarks: Based on data from similar materials

##### **Lithium Manganese (III,IV) oxide:**

Acute oral toxicity : LD50 (Rat): > 2.000 mg/kg  
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg  
Remarks: Based on data from similar materials

##### **Ethylene carbonate:**

Acute oral toxicity : Acute toxicity estimate: 1.900 mg/kg  
Method: Expert judgement  
Remarks: Based on data from similar materials

Acute inhalation toxicity : LC50 (Rat): > 0,73 mg/l  
Exposure time: 8 h  
Test atmosphere: vapour

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg  
Method: OECD Test Guideline 402

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### Lithium hexafluorophosphate:

Acute oral toxicity : LD50 (Rat): > 50 - 300 mg/kg  
Method: OECD Test Guideline 423

Acute inhalation toxicity : Assessment: Corrosive to the respiratory tract.

### Cobalt lithium dioxide:

Acute oral toxicity : LD50 (Rat): > 5.000 mg/kg  
Method: OECD Test Guideline 425

Acute dermal toxicity : LD50 (Rat): > 2.000 mg/kg  
Method: OECD Test Guideline 402  
Remarks: Based on data from similar materials

### N-Methyl-2-pyrrolidone:

Acute oral toxicity : LD50 (Rat): 4.150 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 5,1 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 403

Acute dermal toxicity : LD50 (Rat): > 5.000 mg/kg

### Skin corrosion/irritation

Not classified based on available information.

### Product:

Result : No skin irritation

Remarks : Based on bioavailability assessment according to 1.3.2.4.5  
UN GHS/CLP article 12

### Components:

#### Ethylene carbonate:

Species : Rabbit

Method : OECD Test Guideline 404

Result : No skin irritation

#### Lithium hexafluorophosphate:

Species : reconstructed human epidermis (RhE)

Method : OECD Test Guideline 431

Result : Corrosive after 3 minutes or less of exposure

#### Cobalt lithium dioxide:

Species : reconstructed human epidermis (RhE)

Method : OECD Test Guideline 439

Result : No skin irritation



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### **N-Methyl-2-pyrrolidone:**

||Result : Skin irritation

### **Serious eye damage/eye irritation**

Not classified based on available information.

### **Product:**

Result : No eye irritation  
Remarks : Based on bioavailability assessment according to 1.3.2.4.5  
UN GHS/CLP article 12

### **Components:**

#### **Ethylene carbonate:**

Species : Rabbit  
Method : OECD Test Guideline 405  
Result : Irritation to eyes, reversing within 21 days

#### **Lithium hexafluorophosphate:**

Result : Irreversible effects on the eye  
Remarks : Based on skin corrosivity.

#### **Cobalt lithium dioxide:**

Species : Rabbit  
Method : OECD Test Guideline 405  
Result : No eye irritation

### **N-Methyl-2-pyrrolidone:**

Species : Rabbit  
Result : Irritation to eyes, reversing within 21 days

### **Respiratory or skin sensitisation**

#### **Skin sensitisation**

Not classified based on available information.

#### **Respiratory sensitisation**

Not classified based on available information.

### **Product:**

Assessment : Does not cause respiratory sensitisation.  
Remarks : Based on bioavailability assessment according to 1.3.2.4.5  
UN GHS/CLP article 12

Assessment : Does not cause skin sensitisation.  
Remarks : Based on bioavailability assessment according to 1.3.2.4.5  
UN GHS/CLP article 12

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### Components:

#### **Lithium nickel dioxide:**

Exposure routes	:	Skin contact
Species	:	Humans
Result	:	positive
Assessment	:	Probability or evidence of skin sensitisation in humans
Assessment	:	May cause sensitisation by inhalation.

#### **Lithium Manganese (III,IV) oxide:**

Exposure routes	:	Skin contact
Result	:	negative
Remarks	:	Based on data from similar materials

#### **Ethylene carbonate:**

Test Type	:	Buehler Test
Exposure routes	:	Skin contact
Species	:	Guinea pig
Method	:	OECD Test Guideline 406
Result	:	negative

#### **Lithium hexafluorophosphate:**

Test Type	:	Local lymph node assay (LLNA)
Exposure routes	:	Skin contact
Species	:	Mouse
Method	:	OECD Test Guideline 429
Result	:	negative

#### **Cobalt lithium dioxide:**

Test Type	:	Local lymph node assay (LLNA)
Exposure routes	:	Skin contact
Species	:	Mouse
Method	:	OECD Test Guideline 429
Result	:	negative

Exposure routes	:	inhalation (dust/mist/fume)
Species	:	Humans
Result	:	positive
Remarks	:	Based on data from similar materials

Assessment	:	Probability or evidence of low to moderate respiratory sensitisation rate in humans
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#### **N-Methyl-2-pyrrolidone:**

Test Type	:	Local lymph node assay (LLNA)
Exposure routes	:	Skin contact
Species	:	Mouse
Method	:	OECD Test Guideline 429

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Result : negative  
Remarks : Based on data from similar materials

### Germ cell mutagenicity

Not classified based on available information.

### Components:

#### Lithium nickel dioxide:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro  
Result: positive  
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Sex-linked recessive lethal test in *Drosophila melanogaster* (in vivo)  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Test Type: In vivo mammalian alkaline comet assay  
Species: Rat  
Application Route: inhalation (dust/mist/fume)  
Result: positive  
Remarks: Based on data from similar materials

Test Type: In vivo mammalian alkaline comet assay  
Species: Mouse  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Germ cell mutagenicity- Assessment : Positive result(s) from in vivo mammalian somatic cell mutagenicity tests.

#### Lithium Manganese (III,IV) oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative  
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476

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Result: negative  
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: negative  
Remarks: Based on data from similar materials

### Ethylene carbonate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: negative

### Lithium hexafluorophosphate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

Test Type: In vitro mammalian cell gene mutation test  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro  
Result: positive  
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Germ cell mutagenicity- Assessment : Weight of evidence does not support classification as a germ cell mutagen.

### Cobalt lithium dioxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: positive  
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476

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Result: positive  
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: positive  
Remarks: Based on data from similar materials

### Genotoxicity in vivo

: Test Type: Micronucleus test  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Mutagenicity (in vivo mammalian bone-marrow  
cytogenetic test, chromosomal analysis)  
Species: Mouse  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Rodent dominant lethal test (germ cell) (in vivo)  
Species: Mouse  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

### Germ cell mutagenicity- Assessment

: Positive result(s) from in vivo mammalian somatic cell mutagenicity tests.

### N-Methyl-2-pyrrolidone:

#### Genotoxicity in vitro

: Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative



Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)  
Result: negative

#### Genotoxicity in vivo

: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Ingestion  
Method: OECD Test Guideline 474  
Result: negative



Test Type: Mutagenicity (in vivo mammalian bone-marrow  
cytogenetic test, chromosomal analysis)  
Species: Hamster

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Application Route: Ingestion  
Method: OECD Test Guideline 475  
Result: negative

### **Carcinogenicity**

Not classified based on available information.

### **Product:**

Result : negative  
Remarks : Based on bioavailability assessment according to 1.3.2.4.5  
UN GHS/CLP article 12

### **Components:**

#### **Lithium nickel dioxide:**

Species : Rat  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 2 Years  
Result : positive  
Remarks : Based on data from similar materials

Carcinogenicity - Assessment : Positive evidence from human epidemiological studies (inhalation)

#### **Cobalt lithium dioxide:**

Species : Rat  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 105 weeks  
Result : positive  
Remarks : Based on data from similar materials

Species : Mouse  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 105 weeks  
Result : positive  
Remarks : Based on data from similar materials

Carcinogenicity - Assessment : Sufficient evidence of carcinogenicity in animal experiments

#### **N-Methyl-2-pyrrolidone:**

Species : Rat  
Application Route : Ingestion  
Exposure time : 2 Years  
Result : negative

Species : Rat  
Application Route : inhalation (vapour)  
Exposure time : 2 Years  
Result : negative

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### Reproductive toxicity

Not classified based on available information.

### Product:

Effects on fertility : Result: negative  
Remarks: Based on bioavailability assessment according to 1.3.2.4.5 UN GHS/CLP article 12

Effects on foetal development : Result: negative  
Remarks: Based on bioavailability assessment according to 1.3.2.4.5 UN GHS/CLP article 12

### Components:

#### Lithium nickel dioxide:

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Reproduction/Developmental toxicity screening test  
Species: Rat  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Reproductive toxicity - Assessment : Clear evidence of adverse effects on development, based on animal experiments.

#### Ethylene carbonate:

Effects on fertility : Test Type: Three-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development  
Species: Rabbit  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

#### Lithium hexafluorophosphate:

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development

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Species: Rat  
Application Route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

### Cobalt lithium dioxide:

Effects on fertility

: Test Type: Fertility/early embryonic development  
Species: Rat  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Fertility/early embryonic development  
Species: Mouse  
Application Route: Ingestion  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Fertility/early embryonic development  
Species: Mouse  
Application Route: inhalation (dust/mist/fume)  
Result: positive  
Remarks: Based on data from similar materials

Test Type: Fertility/early embryonic development  
Species: Rat  
Application Route: inhalation (dust/mist/fume)  
Result: positive  
Remarks: Based on data from similar materials

Effects on foetal development

: Test Type: Embryo-foetal development  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 414  
Result: negative  
Remarks: Based on data from similar materials

Reproductive toxicity - Assessment

: Clear evidence of adverse effects on sexual function and fertility, based on animal experiments.

### N-Methyl-2-pyrrolidone:

Effects on fertility

: Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 416  
Result: negative

Effects on foetal development

: Test Type: Embryo-foetal development  
Species: Rat  
Application Route: Ingestion  
Method: OECD Test Guideline 414  
Result: positive



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Test Type: Fertility/early embryonic development  
Species: Rat  
Application Route: inhalation (vapour)  
Result: positive

Test Type: Embryo-foetal development  
Species: Rabbit  
Application Route: Ingestion  
Result: positive

Reproductive toxicity - Assessment : Clear evidence of adverse effects on development, based on animal experiments.

### STOT - single exposure

Not classified based on available information.

#### Components:

##### **N-Methyl-2-pyrrolidone:**

Assessment : May cause respiratory irritation.

### STOT - repeated exposure

Not classified based on available information.

#### Product:

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Remarks : Based on bioavailability assessment according to 1.3.2.4.5 UN GHS/CLP article 12

#### Components:

##### **Lithium nickel dioxide:**

Exposure routes : Inhalation  
Target Organs : Lungs  
Assessment : Shown to produce significant health effects in animals at concentrations of 0.02 mg/l/6h/d or less.

##### **Lithium Manganese (III,IV) oxide:**

Assessment : May cause damage to organs through prolonged or repeated exposure.

##### **Ethylene carbonate:**

Exposure routes : Ingestion  
Target Organs : Kidney  
Assessment : May cause damage to organs through prolonged or repeated exposure.  
Remarks : Based on data from similar materials

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### Lithium hexafluorophosphate:

Exposure routes	: Ingestion
Target Organs	: Bone, Teeth
Assessment	: Shown to produce significant health effects in animals at concentrations of 10 mg/kg bw or less.

Exposure routes	: inhalation (gas)
Target Organs	: Bone, Teeth
Assessment	: Shown to produce significant health effects in animals at concentrations of 50 ppmV/6h/d or less.

### Cobalt lithium dioxide:

Exposure routes	: Ingestion
Target Organs	: Thyroid, Heart, Blood
Assessment	: Shown to produce significant health effects in animals at concentrations of 10 mg/kg bw or less.

Exposure routes	: inhalation (dust/mist/fume)
Target Organs	: Respiratory Tract
Assessment	: Shown to produce significant health effects in animals at concentrations of 0.02 mg/l/6h/d or less.

### Repeated dose toxicity

#### Components:

### Lithium nickel dioxide:

Species	: Rat
LOAEL	: < 0,1 µg/l
Application Route	: inhalation (dust/mist/fume)
Exposure time	: 2 yr
Remarks	: Based on data from similar materials

### Ethylene carbonate:

Species	: Rat
NOAEL	: > 150 mg/kg
Application Route	: Ingestion
Exposure time	: 90 Days
Remarks	: Based on data from similar materials

### Lithium hexafluorophosphate:

Species	: Rat
LOAEL	: < 50 ppm
Application Route	: inhalation (gas)
Exposure time	: 1 Months
Remarks	: Based on data from similar materials

### Cobalt lithium dioxide:

Species	: Rat
LOAEL	: 1,26 mg/kg

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Application Route : Ingestion  
Exposure time : 90 Days  
Method : OECD Test Guideline 408  
Remarks : Based on data from similar materials

Species : Mouse  
LOAEL : < 0,01 mg/l  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 13 Weeks  
Method : OECD Test Guideline 413  
Remarks : Based on data from similar materials

Species : Rat  
LOAEL : < 0,01 mg/l  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 13 Weeks  
Method : OECD Test Guideline 413  
Remarks : Based on data from similar materials

### **N-Methyl-2-pyrrolidone:**

Species : Rat, male  
NOAEL : 169 mg/kg  
LOAEL : 433 mg/kg  
Application Route : Ingestion  
Exposure time : 90 Days  
Method : OECD Test Guideline 408

Species : Rat  
NOAEL : 0,5 mg/l  
LOAEL : 1 mg/l  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 96 Days  
Method : OECD Test Guideline 413

Species : Rabbit  
NOAEL : 826 mg/kg  
LOAEL : 1.653 mg/kg  
Application Route : Skin contact  
Exposure time : 20 Days

### **Aspiration toxicity**

Not classified based on available information.

### **Experience with human exposure**

#### **Components:**

#### **Lithium nickel dioxide:**

Inhalation : Target Organs: Respiratory system  
Symptoms: Tumour

#### **Ethylene carbonate:**

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Ingestion : Target Organs: Kidney

### **Cobalt lithium dioxide:**

Inhalation : Target Organs: Respiratory system

Ingestion : Target Organs: Blood

Target Organs: Heart

Target Organs: Thyroid

### **N-Methyl-2-pyrrolidone:**

Skin contact : Symptoms: Skin irritation

## SECTION 12: Ecological information

### 12.1 Toxicity

#### **Product:**

#### **Ecotoxicology Assessment**

Acute aquatic toxicity : This product has no known ecotoxicological effects.

Remarks: Based on bioavailability assessment according to 1.3.2.4.5 UN GHS/CLP article 12

Chronic aquatic toxicity : This product has no known ecotoxicological effects.

Remarks: Based on bioavailability assessment according to 1.3.2.4.5 UN GHS/CLP article 12

#### **Components:**

#### **Lithium nickel dioxide:**

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): > 0,1 - 1 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates : EC50 (Ceriodaphnia dubia (water flea)): > 0,1 - 1 mg/l  
Exposure time: 48 h  
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 0,1 - 1 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials  
EC10 : > 0,01 - 0,1 mg/l

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Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

M-Factor (Acute aquatic toxicity) : 1

Toxicity to fish (Chronic toxicity) : NOEC: > 0,01 - 0,1 mg/l  
Exposure time: 8 d  
Species: Danio rerio (zebra fish)  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC10: > 0,001 - 0,01 mg/l  
Exposure time: 7 d  
Species: Ceriodaphnia dubia (water flea)  
Remarks: Based on data from similar materials

M-Factor (Chronic aquatic toxicity) : 10

### Lithium Manganese (III,IV) oxide:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 1 - 10 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates : EC50 (Ceriodaphnia dubia (water flea)): > 1 - 10 mg/l  
Exposure time: 48 h  
Remarks: Based on data from similar materials

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): > 1 - 10 mg/l  
Exposure time: 72 h  
Test substance: Water Accommodated Fraction  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

EC10 (Desmodesmus subspicatus (green algae)): > 1 - 10 mg/l  
Exposure time: 72 h  
Test substance: Water Accommodated Fraction  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

Toxicity to fish (Chronic toxicity) : NOEC: > 0,1 - 1 mg/l  
Exposure time: 65 d  
Species: Salvelinus fontinalis (Brook trout)  
Remarks: Based on data from similar materials

### Ethylene carbonate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 203

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- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 100 mg/l  
Exposure time: 48 h  
Method: OECD Test Guideline 202
- Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201
- Toxicity to microorganisms : EC50 : > 1.000 mg/l  
Exposure time: 30 min  
Method: OECD Test Guideline 209

### Lithium hexafluorophosphate:

- Toxicity to fish : LC50 : > 10 - 100 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 10 - 100 mg/l  
Exposure time: 48 h  
Remarks: Based on data from similar materials
- Toxicity to algae/aquatic plants : EC50 : > 10 - 100 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials
- Toxicity to microorganisms : NOEC : > 100 mg/l  
Exposure time: 3 h  
Method: OECD Test Guideline 209  
Remarks: Based on data from similar materials
- Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: > 1 - 10 mg/l  
Exposure time: 21 d  
Species: Daphnia magna (Water flea)  
Remarks: Based on data from similar materials

### Cobalt lithium dioxide:

- Toxicity to fish : LL50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l  
Exposure time: 96 h  
Remarks: Based on transformation/dissolution testing and data from soluble metal compounds
- Toxicity to daphnia and other aquatic invertebrates : EL50 (Ceriodaphnia dubia (water flea)): > 100 mg/l  
Exposure time: 48 h  
Remarks: Based on transformation/dissolution testing and data from soluble metal compounds
- Toxicity to algae/aquatic plants : EL50 (Champia parvula (marine algae)): > 1 - 10 mg/l  
Exposure time: 7 d  
Remarks: Based on transformation/dissolution testing and data from soluble metal compounds
- EL10 (Champia parvula (marine algae)): > 0,1 - 1 mg/l

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Exposure time: 7 d  
Remarks: Based on transformation/dissolution testing and data from soluble metal compounds

Toxicity to fish (Chronic toxicity) : EL10: > 1 mg/l  
Exposure time: 34 d  
Species: Danio rerio (zebra fish)  
Remarks: Based on transformation/dissolution testing and data from soluble metal compounds

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EL10: > 1 mg/l  
Exposure time: 28 d  
Method: OECD Test Guideline 211  
Remarks: Based on transformation/dissolution testing and data from soluble metal compounds

### **N-Methyl-2-pyrrolidone:**

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 500 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1.000 mg/l  
Exposure time: 24 h  
Method: DIN 38412

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 600,5 mg/l  
Exposure time: 72 h  
  
EC10 (Desmodesmus subspicatus (green algae)): 92,6 mg/l  
Exposure time: 72 h

Toxicity to microorganisms : EC50 : > 600 mg/l  
Exposure time: 30 min  
Method: ISO 8192

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 12,5 mg/l  
Exposure time: 21 d  
Species: Daphnia magna (Water flea)  
Method: OECD Test Guideline 211

## 12.2 Persistence and degradability

### Components:

#### **Ethylene carbonate:**

Biodegradability : Result: Readily biodegradable.  
Biodegradation: 92,7 %  
Exposure time: 29 d  
Method: OECD Test Guideline 301B

#### **Lithium hexafluorophosphate:**

Biodegradability : Result: rapidly degradable

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### **N-Methyl-2-pyrrolidone:**

Biodegradability : Result: Readily biodegradable.  
Biodegradation: 73 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301C

### **12.3 Bioaccumulative potential**

#### **Components:**

##### **Ethylene carbonate:**

Partition coefficient: n-octanol/water : log Pow: 0,11

##### **N-Methyl-2-pyrrolidone:**

Partition coefficient: n-octanol/water : log Pow: -0,46  
Method: OECD Test Guideline 107

### **12.4 Mobility in soil**

No data available

### **12.5 Results of PBT and vPvB assessment**

Not relevant

### **12.6 Other adverse effects**

No data available

## **SECTION 13: Disposal considerations**

### **13.1 Waste treatment methods**

Product : Dispose of in accordance with local regulations.  
According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.  
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.  
If not otherwise specified: Dispose of as unused product.

Waste Code : The following Waste Codes are only suggestions:

used product  
16 06 05, other batteries and accumulators

unused product  
16 06 05, other batteries and accumulators

uncleaned packagings  
15 01 10, packaging containing residues of or contaminated by hazardous substances



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### SECTION 14: Transport information

#### 14.1 UN number

ADN	:	UN 3480
ADR	:	UN 3480
RID	:	UN 3480
IMDG	:	UN 3480
IATA (Cargo)	:	UN 3480
IATA (Passenger)	:	UN 3480
		Not permitted for transport

#### 14.2 UN proper shipping name

ADN	:	LITHIUM ION BATTERIES
ADR	:	LITHIUM ION BATTERIES
RID	:	LITHIUM ION BATTERIES
IMDG	:	LITHIUM ION BATTERIES
IATA (Cargo)	:	Lithium ion batteries
IATA (Passenger)	:	LITHIUM ION BATTERIES
		Not permitted for transport

#### 14.3 Transport hazard class(es)

ADN	:	9
ADR	:	9
RID	:	9
IMDG	:	9
IATA (Cargo)	:	9
IATA (Passenger)	:	Not permitted for transport

#### 14.4 Packing group

ADN		
Packing group	:	Not assigned by regulation
Classification Code	:	M4
Labels	:	9A
ADR		
Packing group	:	Not assigned by regulation
Classification Code	:	M4
Labels	:	9A
Tunnel restriction code	:	(E)
RID		
Packing group	:	Not assigned by regulation
Classification Code	:	M4
Hazard Identification Number	:	90
Labels	:	9A

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### IMDG

Packing group	:	Not assigned by regulation
Labels	:	9A
EmS Code	:	F-A, S-I

### IATA (Cargo)

Packing instruction (cargo aircraft)	:	965
Packing group	:	Not assigned by regulation
Labels	:	

IATA (Passenger)	:	Not permitted for transport
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### 14.5 Environmental hazards

#### ADN

Environmentally hazardous	:	no
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#### ADR

Environmentally hazardous	:	no
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#### RID

Environmentally hazardous	:	no
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#### IMDG

Marine pollutant	:	no
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### 14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

### 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Remarks	:	Not applicable for product as supplied.
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## SECTION 15: Regulatory information

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

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	N-Methyl-2-pyrrolidone
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REACH - List of substances subject to authorisation (Annex XIV)	:	Not applicable
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Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	:	Not applicable
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Regulation (EC) No 850/2004 on persistent organic pollutants	:	Not applicable
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Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals	:	Not applicable
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REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII) : Conditions of restriction for the following entries should be considered:  
Nickel (Number on list 27)  
N-Methyl-2-pyrrolidone (Number on list 72, 71, 30)  
Lithium nickel dioxide (Number on list 28)

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.  
Not applicable

Water contaminating class (Germany) : WGK 3 highly hazardous to water  
Classification according to AwSV, Annex 1 (5.2)

Volatile organic compounds : Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control)  
Remarks: Not applicable

### Other regulations:

Contains a substance which is subject to the TRGS 905 list of carcinogenic, germ cell mutagenic and reproductive toxic substances. : Cobalt lithium dioxide

### 15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

## SECTION 16: Other information

Other information : Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

### Full text of H-Statements

H301	: Toxic if swallowed.
H302	: Harmful if swallowed.
H314	: Causes severe skin burns and eye damage.
H315	: Causes skin irritation.
H317	: May cause an allergic skin reaction.
H318	: Causes serious eye damage.
H319	: Causes serious eye irritation.
H334	: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	: May cause respiratory irritation.
H341	: Suspected of causing genetic defects.
H350	: May cause cancer.
H350i	: May cause cancer by inhalation.
H360D	: May damage the unborn child.
H360F	: May damage fertility.
H372	: Causes damage to organs through prolonged or repeated exposure.
H373	: May cause damage to organs through prolonged or repeated exposure.

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H373 : exposure.  
: May cause damage to organs through prolonged or repeated exposure if swallowed.  
H400 : Very toxic to aquatic life.  
H410 : Very toxic to aquatic life with long lasting effects.  
H411 : Toxic to aquatic life with long lasting effects.

### Full text of other abbreviations

Acute Tox.	: Acute toxicity
Aquatic Acute	: Short-term (acute) aquatic hazard
Aquatic Chronic	: Long-term (chronic) aquatic hazard
Carc.	: Carcinogenicity
Eye Dam.	: Serious eye damage
Eye Irrit.	: Eye irritation
Muta.	: Germ cell mutagenicity
Repr.	: Reproductive toxicity
Resp. Sens.	: Respiratory sensitisation
Skin Corr.	: Skin corrosion
Skin Irrit.	: Skin irritation
Skin Sens.	: Skin sensitisation
STOT RE	: Specific target organ toxicity - repeated exposure
STOT SE	: Specific target organ toxicity - single exposure
2000/39/EC	: Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
2009/161/EU	: Europe. COMMISSION DIRECTIVE 2009/161/EU establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC
2017/164/EU	: Commission Directive (EU) 2017/164 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU
DE TRGS 900	: Germany. TRGS 900 - Occupational exposure limit values.
DE TRGS 910	: Germany. TRGS 910 - Substance-specific acceptable and tolerable concentrations and equivalence values for carcinogenic hazardous substances.
TRGS 903	: TRGS 903 - Biological limit values
2000/39/EC / TWA	: Limit Value - eight hours
2000/39/EC / STEL	: Short term exposure limit
2009/161/EU / TWA	: Limit Value - eight hours
2009/161/EU / STEL	: Short term exposure limit
2017/164/EU / TWA	: Limit Value - eight hours
DE TRGS 900 / AGW	: Time Weighted Average
DE TRGS 910 / Acceptable concentration	: Acceptable concentration
DE TRGS 910 / Tolerable concentration	: Tolerable concentration

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada)

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da); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organization for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

### Further information

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

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The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

DE / EN