

Safety Data Sheet

(According to Regulation (EC) No. 1907/2006 (REACH)
and its amendment Regulation (EU) 2020/878)

Applicant: Invox Hardware Limited

Address: Unit 503, 5/F, Silvercord Tower 2, 30 Canton Road,
Tsimshatsui, Kowloon, Hong Kong

Sample Description: LITHIUM ION BATTERIES

Model No.: 107683

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Article
Trade name : LITHIUM ION BATTERIES
Model No. : 107683

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

1.2.1. Relevant identified uses

Use of the substance/mixture : Power Tools, Household Appliances

1.2.2. Uses advised against

Restrictions on use : No information available

1.3. Details of the supplier of the safety data sheet

Supplier

SAMSUNG SDI Co., Ltd.
150-20, Gongse-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
1-800-424-9300: US and Canada / 1-703-527-3887: International

1.4. Emergency telephone number

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Not classified

Adverse physicochemical, human health and environmental effects

To our knowledge, this product does not present any particular risk, provided it is handled in accordance with good occupational hygiene and safety practice.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) : Not applicable.
Signal word (CLP) : Not applicable.
Hazard statements (CLP) : Not applicable.
Precautionary statements (CLP) : Not applicable.
EUH-statements : Not applicable.

2.3. Other hazards

Other hazards which do not result in classification : No information available.

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

Contains no PBT and/or vPvB substances $\geq 0.1\%$ assessed in accordance with REACH Annex XIII

The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or substance(s) are not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %.

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable.

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Lithium nickel oxide (Li ₂ NiO ₂)	CAS-No.: 12325-84-7	25 – 35	Not classified
Graphite	CAS-No.: 7782-42-5 EC-No.: 231-955-3 REACH-no: No information available	20 – 30	Not classified
Iron	CAS-No.: 7439-89-6 EC-No.: 215-168-2; 231-096-4	10 – 20	Not classified
Copper	CAS-No.: 7440-50-8 EC-No.: 231-159-6 EC Index-No.: 029-024-00-X	5 – 15	Aquatic Chronic 2, H411
Cobaltate (CoO ₂ 1-), lithium	CAS-No.: 12190-79-3 EC-No.: 235-362-0	1 – 5	Repr. 1B, H360Fd
Propanoic acid, methyl ester	CAS-No.: 554-12-1 EC-No.: 209-060-4 EC Index-No.: 607-027-00-2	1 – 5	Flam. Liq. 2, H225 Acute Tox. 4 (Inhalation), H332
Aluminum	CAS-No.: 7429-90-5 EC-No.: 231-072-3 EC Index-No.: 013-002-00-1	1 – 5	Flam. Sol. 1, H228 Water-react. 2, H261
Phosphate(1-), hexafluoro-, lithium	CAS-No.: 21324-40-3 EC-No.: 244-334-7	1 – 3	Acute Tox. 3 (Oral), H301 Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT RE 1, H372
4-Fluoro-1,3-dioxolan-2-one	CAS-No.: 114435-02-8 EC-No.: 483-360-5; 601-313-0	1 – 3	Acute Tox. 4 (Oral), H302 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Skin Sens. 1, H317 STOT RE 1, H372
Dimethyl carbonate	CAS-No.: 616-38-6 EC-No.: 210-478-4 EC Index-No.: 607-013-00-6	1 – 3	Flam. Liq. 2, H225
Ethene, homopolymer	CAS-No.: 9002-88-4 EC-No.: 618-339-3	1 – 3	Not classified
Iron oxide (Fe ₂ O ₃)	CAS-No.: 1309-37-1 EC-No.: 215-168-2	0.1 – 1	Not classified
Boehmite	CAS-No.: 1318-23-6 EC-No.: 215-284-3 REACH-no: 01-2119555298-28	0.1 – 1	Not classified

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Carbon black	CAS-No.: 1333-86-4 EC-No.: 215-609-9;435-640-3	0.1 – 1	Not classified
Nickel	CAS-No.: 7440-02-0 EC-No.: 231-111-4 EC Index-No.: 028-002-00-7	0.1 – 1	Skin Sens. 1, H317 Carc. 2, H351 STOT RE 1, H372
1-Methyl-2-pyrrolidone substance listed as REACH Candidate (1-Methyl-2-pyrrolidone (NMP))	CAS-No.: 872-50-4 EC-No.: 212-828-1 EC Index-No.: 606-021-00-7	0.1 – 1	Skin Irrit. 2, H315 Eye Irrit. 2, H319 Repr. 1B, H360D STOT SE 3, H335
Aluminum lithium oxide (AlLiO)	CAS-No.: 11089-89-7	0.1 – 1	Not classified
Chromium	CAS-No.: 7440-47-3 EC-No.: 231-157-5	0.1 – 1	Not classified
Lithium carbonate	CAS-No.: 554-13-2 EC-No.: 209-062-5	0.1 – 1	Not classified
Ethylbenzene	CAS-No.: 100-41-4 EC-No.: 202-849-4 EC Index-No.: 601-023-00-4	0.1 – 1	Flam. Liq. 2, H225 Acute Tox. 4 (Inhalation), H332 STOT RE 2, H373 Asp. Tox. 1, H304

Specific concentration limits:

Name	Product identifier	Specific concentration limits (%)
1-Methyl-2-pyrrolidone	CAS-No.: 872-50-4 EC-No.: 212-828-1 EC Index-No.: 606-021-00-7	(10 ≤ C < 100) STOT SE 3, H335

Full text of H- and EUH-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation	: Not an expected route of exposure. Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a poison center or a doctor.
First-aid measures after skin contact	: Not an expected route of exposure. Wash skin with plenty of water. If skin irritation occurs : Get medical advice/attention.
First-aid measures after eye contact	: Not an expected route of exposure. Rinse eyes with water as a precaution. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion	: Not an expected route of exposure. Call a poison center or a doctor if you feel unwell.

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

Symptoms/effects	: No information available.
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4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Water spray. Dry powder. Foam.
Unsuitable extinguishing media	: No information available.

5.2. Special hazards arising from the substance or mixture

Fire hazard	: No fire hazard.
Explosion hazard	: No direct explosion hazard.
Hazardous decomposition products in case of fire	: Toxic fumes may be released.

5.3. Advice for firefighters

Firefighting instructions	: Fight fire from safe distance and protected location. Do not enter fire area without proper protective equipment, including respiratory protection. Access forbidden to unauthorised personnel. Approach from upwind. Cool down the containers exposed to heat with a water spray. Do not allow run-off from fire fighting to enter drains or water courses. Eliminate all ignition sources if safe to do so. Move containers from fire area if it can be done without personal risk.
Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment	: Wear recommended personal protective equipment.
Emergency procedures	: Ventilate spillage area. Access forbidden to unauthorised personnel. Avoid breathing (dust, vapor, mist, gas). Avoid contact with eyes, skin and clothing.

6.1.2. For emergency responders

Protective equipment	: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures	: Evacuate unnecessary personnel. Evacuate personnel to a safe area. Stop leak if safe to do so.

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment	: Collect spillage.
Methods for cleaning up	: Mechanically recover the product. Absorb and/or contain spill with inert material (sand, vermiculite or other appropriate material), then place in suitable container. Collect all waste in suitable and labelled containers and dispose according to local legislation.
Other information	: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	: Ensure good ventilation of the work station. Wear personal protective equipment. Do not open, destroy, or incinerate batteries because the battery may explode, break, or vent during these processes. Do not short-circuit the battery, overcharge, forced discharge or thrown into the fire. Do not squeeze the battery or immerse the battery in the solution. Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs.
Hygiene measures	: Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	: Keep in a cool, well-ventilated place away from heat.
Storage conditions	: Protect from sunlight. Avoid high temperatures. Store in a dry, cool and well-ventilated place.
Incompatible materials	: No information available.
Packaging materials	: No information available.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

Graphite (7782-42-5)	
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	5 mg/m ³ (alveolar dust with <1% Quartz, respirable fraction)
MAK (OEL STEL)	10 mg/m ³ (alveolar dust with <1% Quartz, respirable fraction)
Belgium - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (except fibers-alveolar fraction)
Bulgaria - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (inhalable fraction)
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	4 mg/m ³ (respirable dust) 10 mg/m ³ (total dust, inhalable particles)
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	2 mg/m ³ (dust)
Denmark - Occupational Exposure Limits	
OEL TWA	2.5 mg/m ³ (natural-respirable)
OEL STEL	5 mg/m ³ (natural-respirable)
Estonia - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (total dust)

Graphite (7782-42-5)	
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	2 mg/m ³
France - Occupational Exposure Limits	
VME (OEL TWA)	2 mg/m ³ (alveolar fraction)
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA)	1.25 mg/m ³ (respirable fraction (dust)) 10 mg/m ³ (inhalable fraction (dust))
Greece - Occupational Exposure Limits	
OEL TWA	10 mg/m ³ (inhalable fraction) 5 mg/m ³ (respirable fraction)
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	5 mg/m ³ (inhalable concentration (flying and fibrous powders)) 2 mg/m ³ (respirable concentration (flying and fibrous powders))
Ireland - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (all forms except fibres; respirable fraction)
OEL STEL	6 mg/m ³ (calculated-all forms except fibres; respirable fraction)
Latvia - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (Carbon dust)
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	5 mg/m ³ (dust)
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	4 mg/m ³ (natural-inhalable fraction) 1 mg/m ³ (natural-respirable fraction) 6 mg/m ³ (synthetic-inhalable fraction)
Portugal - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (all forms except Graphite fibers-respirable fraction)
Romania - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (Quartz ≤5%-dust, respirable fraction)
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	10 mg/m ³ (total aerosol) 2 mg/m ³ (respirable fraction)
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	2 mg/m ³ (see UNE EN 481:1995 on workplace atmospheres-dust; respirable fraction)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	10 mg/m ³ (inhalable dust) 4 mg/m ³ (respirable dust)

Graphite (7782-42-5)	
WEL STEL (OEL STEL)	30 mg/m ³ (calculated-inhalable dust) 12 mg/m ³ (calculated-respirable dust)
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	5 mg/m ³ (natural-total dust) 2 mg/m ³ (natural-respirable dust) 10 mg/m ³ (synthetic-total dust) 4 mg/m ³ (synthetic-respirable dust)
Korttidsverdi (OEL STEL)	10 mg/m ³ (natural-total dust) 4 mg/m ³ (natural-respirable dust) 20 mg/m ³ (synthetic-total dust) 8 mg/m ³ (synthetic-respirable dust)
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	3 mg/m ³ (natural-respirable dust) 3 mg/m ³ (total dust limit values-respirable fraction) 10 mg/m ³ (total dust limit values-inhalable fraction)
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	2 mg/m ³ (all forms except graphite fibers-respirable particulate matter)
Iron (7439-89-6)	
Bulgaria - Occupational Exposure Limits	
OEL TWA	6 mg/m ³ (containing <2% free Crystalline silicon dioxide in respirable fraction-dust, inhalable fraction)
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	6 mg/m ³ (total aerosol)
Copper (7440-50-8)	
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	1 mg/m ³ (inhalable fraction) 0.1 mg/m ³ (respirable fraction, smoke)
MAK (OEL STEL)	4 mg/m ³ (inhalable fraction) 0.4 mg/m ³ (respirable fraction, smoke)
Belgium - Occupational Exposure Limits	
OEL TWA	0.2 mg/m ³ (fume) 1 mg/m ³ (dust and mist)
Bulgaria - Occupational Exposure Limits	
OEL TWA	0.1 mg/m ³ (metal vapor)
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	0.2 mg/m ³ (fume) 1 mg/m ³ (dust)
KGVI (OEL STEL)	2 mg/m ³ (dust)

Copper (7440-50-8)	
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	1 mg/m ³ (dust) 0.1 mg/m ³ (fume)
Denmark - Occupational Exposure Limits	
OEL TWA	1 mg/m ³ (dust and powder) 0.1 mg/m ³ (fume)
OEL STEL	2 mg/m ³ (dust and powder) 0.2 mg/m ³ (fume)
Estonia - Occupational Exposure Limits	
OEL TWA	1 mg/m ³ (total dust) 0.2 mg/m ³ (respirable dust)
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	0.02 mg/m ³ (respirable dust)
France - Occupational Exposure Limits	
VME (OEL TWA)	0.2 mg/m ³ (fume) 1 mg/m ³ (dust)
VLE (OEL C/STEL)	2 mg/m ³ (dust)
Greece - Occupational Exposure Limits	
OEL TWA	0.2 mg/m ³ (fume) 1 mg/m ³ (dust)
OEL STEL	2 mg/m ³ (dust)
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	0.1 mg/m ³ 0.01 mg/m ³ (fume; respirable fraction)
CK (OEL STEL)	0.2 mg/m ³
Ireland - Occupational Exposure Limits	
OEL TWA	0.2 mg/m ³ (fume) 1 mg/m ³ (dusts and mists)
OEL STEL	2 mg/m ³ (dusts and mists) 0.6 mg/m ³ (calculated-fume)
Latvia - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	1 mg/m ³ (inhalable fraction) 0.2 mg/m ³ (respirable fraction)
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	0.1 mg/m ³ (inhalable dust)



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Copper (7440-50-8)	
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	0.2 mg/m ³
Portugal - Occupational Exposure Limits	
OEL TWA	0.2 mg/m ³ (fume) 1 mg/m ³ (dust; mist)
Romania - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³ (dust)
OEL STEL	0.2 mg/m ³ (fume) 1.5 mg/m ³ (dust)
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	1 mg/m ³ (inhalable fraction) 0.2 mg/m ³ (respirable fraction)
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	0.01 mg/m ³ (see UNE EN 481:1995 on workplace atmospheres-respirable fraction)
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	0.01 mg/m ³ (respirable fraction)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	1 mg/m ³ (dust and mists) 0.2 mg/m ³ (fume)
WEL STEL (OEL STEL)	0.6 mg/m ³ (calculated-fume) 2 mg/m ³ (dust and mist)
Norway - Occupational Exposure Limits	
Grønseverdi (OEL TWA)	0.1 mg/m ³ (fume) 1 mg/m ³ (dust)
Korttidsverdi (OEL STEL)	3 mg/m ³ (value calculated-dust) 0.3 mg/m ³ (value calculated-fume)
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	0.1 mg/m ³ (inhalable dust)
KZGW (OEL STEL)	0.2 mg/m ³ (inhalable dust)
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	0.2 mg/m ³ (fume)
Aluminum (7429-90-5)	
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	10 mg/m ³ (inhalable fraction)
MAK (OEL STEL)	20 mg/m ³ (inhalable fraction)

Aluminum (7429-90-5)	
Belgium - Occupational Exposure Limits	
OEL TWA	1 mg/m ³
Bulgaria - Occupational Exposure Limits	
OEL TWA	10 mg/m ³ (inhalable fraction) 1.5 mg/m ³ (respirable fraction)
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	10 mg/m ³ (total dust, inhalable particles) 4 mg/m ³ (respirable dust)
Croatia - Biological limit values	
BLV	200 µg/l Parameter: Aluminum - Medium: urine - Sampling time: at the end of the work shift
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	10 mg/m ³ (dust)
Denmark - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (total, dust and powder) 2 mg/m ³ (respirable, dust and powder)
OEL STEL	10 mg/m ³ (total, dust and powder) 4 mg/m ³ (respirable, dust and powder)
Estonia - Occupational Exposure Limits	
OEL TWA	10 mg/m ³ (total dust) 4 mg/m ³ (respirable dust)
France - Occupational Exposure Limits	
VME (OEL TWA)	10 mg/m ³ (metal) 5 mg/m ³ (dust)
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA)	1.25 mg/m ³ (respirable fraction (dust)) 10 mg/m ³ (inhalable fraction (dust))
Germany - Biological limit values (TRGS 903)	
Biological limit value	50 µg/g creatinine Parameter: Aluminum - Medium: urine - Sampling time: for long-term exposures: at the end of the shift after several shifts
Greece - Occupational Exposure Limits	
OEL TWA	10 mg/m ³ (inhalable fraction) 5 mg/m ³ (respirable fraction)
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	1 mg/m ³ (respirable fraction)
Ireland - Occupational Exposure Limits	
OEL TWA	1 mg/m ³ (respirable fraction)
OEL STEL	3 mg/m ³ (calculated-respirable dust)



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Aluminum (7429-90-5)	
Latvia - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	5 mg/m ³ (inhalable fraction) 2 mg/m ³ (respirable fraction) 1 mg/m ³
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	2.5 mg/m ³ (non-stabilized-inhalable fraction) 1.2 mg/m ³ (non-stabilized-respirable fraction)
Portugal - Occupational Exposure Limits	
OEL TWA	1 mg/m ³ (metal-respirable fraction)
OEL chemical category	A4 - Not Classifiable as a Human Carcinogen
Romania - Occupational Exposure Limits	
OEL TWA	3 mg/m ³ (dust) 1 mg/m ³ (fume)
OEL STEL	10 mg/m ³ (dust) 3 mg/m ³ (fume)
Romania - Biological limit values	
BLV	200 µg/l Parameter: Aluminum - Medium: urine - Sampling time: end of shift
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	4 mg/m ³ (inhalable dust) 1.5 mg/m ³ (respirable dust)
Slovakia - Biological limit values	
BLV	60 µg/g creatinine Parameter: Aluminum - Medium: urine - Sampling time: not critical
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	1 mg/m ³ (see UNE EN 481:1995 on workplace atmospheres-respirable fraction)
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	5 mg/m ³ (total dust) 2 mg/m ³ (respirable fraction)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	10 mg/m ³ (inhalable dust) 4 mg/m ³ (respirable dust)
WEL STEL (OEL STEL)	30 mg/m ³ (calculated-inhalable dust) 12 mg/m ³ (calculated-respirable dust)
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	5 mg/m ³ (pyrotechnical-powder)
Korttidsverdi (OEL STEL)	10 mg/m ³ (pyrotechnical-powder)



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Aluminum (7429-90-5)	
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	3 mg/m ³ (respirable dust) 3 mg/m ³ (total dust limit values-respirable fraction) 10 mg/m ³ (total dust limit values-inhalable fraction)
Switzerland - BAT	
BAT	50 µg/g creatinine Parameter: Aluminum - Medium: urine - Sampling time: after several shifts (for long-term exposures) (metal) Parameter: Aluminum - Medium: urine - Sampling time: after several shifts (for long-term exposures) (metal)
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	1 mg/m ³ (respirable particulate matter)
ACGIH chemical category	Not Classifiable as a Human Carcinogen
Ethene, homopolymer (9002-88-4)	
Bulgaria - Occupational Exposure Limits	
OEL TWA	10 mg/m ³ (dust (Dust from Polyethylene))
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	5 mg/m ³ (dust)
Latvia - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (dust (Polymers dust))
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	10 mg/m ³
Iron oxide (Fe₂O₃) (1309-37-1)	
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	5 mg/m ³ (respirable fraction)
MAK (OEL STEL)	10 mg/m ³ (respirable fraction)
Belgium - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (alveolar fraction)
Bulgaria - Occupational Exposure Limits	
OEL TWA	5 mg/m ³
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	4 mg/m ³ (respirable dust) 5 mg/m ³ (fume) 10 mg/m ³ (total dust, inhalable particles)
KGVI (OEL STEL)	10 mg/m ³ (fume)
Denmark - Occupational Exposure Limits	
OEL TWA	3.5 mg/m ³
OEL STEL	7 mg/m ³

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Iron oxide (Fe₂O₃) (1309-37-1)	
Estonia - Occupational Exposure Limits	
OEL TWA	3.5 mg/m ³
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	5 mg/m ³ (fume)
France - Occupational Exposure Limits	
VME (OEL TWA)	5 mg/m ³ (fume) 10 mg/m ³ (as synthetic red)
Greece - Occupational Exposure Limits	
OEL TWA	10 mg/m ³
OEL STEL	10 mg/m ³
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	4 mg/m ³ (respirable fraction)
Ireland - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (fume) 10 mg/m ³ (total inhalable dust) 4 mg/m ³ (respirable dust)
OEL STEL	10 mg/m ³ (fume) 12 mg/m ³ (calculated) 30 mg/m ³ (calculated)
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	3.5 mg/m ³ (inhalable fraction)
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	2.5 mg/m ³ (respirable fraction) 5 mg/m ³ (inhalable fraction)
NDSch (OEL STEL)	10 mg/m ³ (inhalable fraction (Iron oxides)) 5 mg/m ³ (respirable fraction (Iron oxides))
Portugal - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (respirable fraction)
OEL chemical category	A4 - Not Classifiable as a Human Carcinogen
Romania - Occupational Exposure Limits	
OEL TWA	5 mg/m ³ (dust and fume)
OEL STEL	10 mg/m ³ (dust and fume)
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	1.5 mg/m ³ (respirable fraction)
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	5 mg/m ³ (dust and fume)

Iron oxide (Fe₂O₃) (1309-37-1)	
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	3.5 mg/m ³ (respirable fraction)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	5 mg/m ³ (fume) 10 mg/m ³ (total inhalable) 4 mg/m ³ (respirable)
WEL STEL (OEL STEL)	10 mg/m ³ (fume) 30 mg/m ³ (calculated-total inhalable) 12 mg/m ³ (calculated-respirable)
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	3 mg/m ³
Korttidsverdi (OEL STEL)	6 mg/m ³ (value calculated)
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	3 mg/m ³ (respirable dust)
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	5 mg/m ³ (respirable particulate matter)
ACGIH chemical category	Not Classifiable as a Human Carcinogen
Carbon black (1333-86-4)	
Belgium - Occupational Exposure Limits	
OEL TWA	3 mg/m ³
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	3.5 mg/m ³
KGVI (OEL STEL)	7 mg/m ³
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	2 mg/m ³ (dust)
Denmark - Occupational Exposure Limits	
OEL TWA	3.5 mg/m ³
OEL STEL	7 mg/m ³
Estonia - Occupational Exposure Limits	
OEL TWA	3 mg/m ³
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	3.5 mg/m ³
HTP (OEL STEL)	7 mg/m ³
France - Occupational Exposure Limits	
VME (OEL TWA)	3.5 mg/m ³

Carbon black (1333-86-4)	
Greece - Occupational Exposure Limits	
OEL TWA	3.5 mg/m ³
OEL STEL	7 mg/m ³
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	3 mg/m ³ (inhalable concentration (flying and fibrous powders))
Ireland - Occupational Exposure Limits	
OEL TWA	3 mg/m ³ (inhalable fraction)
OEL STEL	15 mg/m ³ (calculated-inhalable fraction)
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	4 mg/m ³ (inhalable fraction)
Portugal - Occupational Exposure Limits	
OEL TWA	3 mg/m ³ (inhalable fraction)
OEL chemical category	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	2 mg/m ³ (respirable fraction, 5% or less fibrogenic component) 10 mg/m ³ (respirable fraction, greater than 5% fibrogenic component) 10 mg/m ³ (total aerosol)
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	3.5 mg/m ³
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	3 mg/m ³ (inhalable fraction)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	3.5 mg/m ³
WEL STEL (OEL STEL)	7 mg/m ³
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	3.5 mg/m ³
Korttidsverdi (OEL STEL)	7 mg/m ³ (value calculated)
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	3 mg/m ³ (inhalable particulate matter)
ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans
Nickel (7440-02-0)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Nickel metal
IOEL TWA	0.005 mg/m ³ (respirable fraction)
Remark	(Year of adoption 2011)

Nickel (7440-02-0)	
Regulatory reference	SCOEL Recommendations
EU - Biological Limit Value (BLV)	
Local name	Nickel and nickel compounds
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs
Austria - Occupational Exposure Limits	
TRK (OEL TWA)	0.5 mg/m ³ (dust, inhalable fraction)
OEL chemical category	Group A1 Carcinogen dust, Respiratory sensitizer dust, Skin sensitizer
Belgium - Occupational Exposure Limits	
OEL TWA	1 mg/m ³
Bulgaria - Occupational Exposure Limits	
OEL TWA	0.05 mg/m ³
Bulgaria - Biological limit values	
BLV	45 µg/l Parameter: Nickel - Medium: urine - Sampling time: after several work shifts
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	0.5 mg/m ³
Croatia - Biological limit values	
BLV	10 µg/l Parameter: Nickel - Medium: plasma - Sampling time: at the end of the work shift 8 µg/g creatinine Parameter: Nickel - Medium: urine - Sampling time: at the end of the work shift (calculated on the average Creatinine value of 1.2 g/L urine)
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	0.5 mg/m ³ (respirable fraction of aerosol)
OEL chemical category	Sensitizer
Czech Republic - Biological limit values	
BLV	0.077 µmol/mmol Creatinine Parameter: Nickel - Medium: urine - Sampling time: discretionary 0.04 mg/g creatinine Parameter: Nickel - Medium: urine - Sampling time: discretionary
Denmark - Occupational Exposure Limits	
OEL TWA	0.05 mg/m ³ (dust and powder)
OEL STEL	0.1 mg/m ³ (dust and powder)
Estonia - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³
OEL chemical category	Sensitizer
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	0.01 mg/m ³ (respirable dust)

Nickel (7440-02-0)	
Finland - Biological limit values	
BLV	0.1 µmol/l Parameter: Nickel - Medium: urine - Sampling time: after the shift after a working week or exposure period
France - Occupational Exposure Limits	
VME (OEL TWA)	1 mg/m ³ 1 mg/m ³ (metal gratings)
OEL chemical category	Carcinogen category 2
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA)	0.03 mg/m ³ (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-respirable fraction) 0.006 mg/m ³ (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-inhalable fraction)
Chemical category	Skin sensitization
Greece - Occupational Exposure Limits	
OEL TWA	1 mg/m ³
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	0.01 mg/m ³
OEL chemical category	Sensitizer, Carc. 1B - Presumed Carcinogen
Ireland - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³
OEL STEL	1.5 mg/m ³ (calculated)
OEL chemical category	Sensitizer
Latvia - Occupational Exposure Limits	
OEL TWA	0.05 mg/m ³
Latvia - Biological Exposure Indices	
BEI	3 µg/l Parameter: Nickel - Medium: urine
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	0.5 mg/m ³
OEL chemical category	Sensitizer, Carcinogen
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	0.25 mg/m ³
Portugal - Occupational Exposure Limits	
OEL TWA	1.5 mg/m ³ (inhalable fraction)
OEL chemical category	A5 - Not Suspected as a Human Carcinogen
Romania - Occupational Exposure Limits	
OEL TWA	0.1 mg/m ³

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Nickel (7440-02-0)	
OEL STEL	0.5 mg/m ³
OEL chemical category	C2
Romania - Biological limit values	
BLV	3 µg/l Parameter: Nickel - Medium: urine - Sampling time: end of shift (SCOEL)
Slovakia - Biological limit values	
BLV	0.03 mg/l Parameter: Nickel - Medium: blood - Sampling time: end of exposure or work shift
Slovenia - Occupational Exposure Limits	
OEL TWA	0.006 mg/m ³ (respirable fraction)
OEL STEL	0.048 mg/m ³ (respirable fraction)
OEL chemical category	Category 2
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	1 mg/m ³ (manufacturing, commercialization and use restrictions according to REACH)
OEL chemical category	Sensitizer
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	0.5 mg/m ³ (total dust)
OEL chemical category	Sensitizer
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	0.5 mg/m ³
WEL STEL (OEL STEL)	1.5 mg/m ³ (calculated)
WEL chemical category	Potential for cutaneous absorption
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	0.05 mg/m ³
Korttidsverdi (OEL STEL)	0.15 mg/m ³ (value calculated)
OEL chemical category	Carcinogen, Potential reproductive hazard, Allergenic substance
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	0.5 mg/m ³ (inhalable dust)
OEL chemical category	Sensitizer, Category C2 carcinogen
Switzerland - BAT	
BAT	45 µg/l Parameter: Nickel - Medium: urine - Sampling time: end of shift, and after several shifts (for long-term exposures) 766.6 nmol/L Parameter: Nickel - Medium: urine - Sampling time: end of shift, and after several shifts (for long-term exposures)
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	1.5 mg/m ³ (inhalable particulate matter)



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Nickel (7440-02-0)	
ACGIH chemical category	Not Suspected as a Human Carcinogen
USA - ACGIH - Biological Exposure Indices	
BEI	5 µg/l Parameter: Nickel - Medium: urine - Sampling time: post-shift at end of workweek (background)
1-Methyl-2-pyrrolidone (872-50-4)	
EU - Indicative Occupational Exposure Limit (IOEL)	
IOEL TWA	40 mg/m ³
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	1-Methyl-2-pyrrolidone
BOEL TWA	40 mg/m ³
	10 ppm
BOEL STEL	80 mg/m ³
	20 ppm
Notes	Skin (Substantial contribution to the total body burden via dermal exposure possible)
Regulatory reference	DIRECTIVE (EU) 2022/431 (amending Directive 2004/37/EC)
EU - Biological Limit Value (BLV)	
Local name	N-Methyl-2-pyrrolidone
BLV	20 mg/g creatinine Parameter: 2-hydroxy-N-methylsuccinimide - Medium: urine - Sampling time: morning-after-shift ; 18 hours 70 mg/g creatinine Parameter: 5-hydroxy-N-methyl-2-pyrrolidone - Medium: urine - Sampling time: 2-4 hours after the end of exposure/shift
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	14.4 mg/m ³
	3.6 ppm
MAK (OEL STEL)	28.8 mg/m ³
	7.2 ppm
OEL chemical category	Skin notation
Belgium - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Skin, Skin notation

1-Methyl-2-pyrrolidone (872-50-4)	
Bulgaria - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	40 mg/m ³
	10 ppm
KGV (OEL STEL)	80 mg/m ³
	20 ppm
OEL chemical category	Skin notation, Reproductive Toxin Category 1B
Croatia - Biological limit values	
BLV	20 mg/g creatinine Parameter: 2-Hydroxy-N-methylsuccinimide - Medium: urine - Sampling time: about 16 hours after completion of the work shift (calculated on the average Creatinine value of 1.2 g/L urine) 70 mg/g creatinine Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone - Medium: urine - Sampling time: 2-4 times after the work shift/break (calculated on the average Creatinine value of 1.2 g/L urine)
Cyprus - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Skin-potential for cutaneous absorption
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	40 mg/m ³
OEL chemical category	Potential for cutaneous absorption
Denmark - Occupational Exposure Limits	
OEL TWA	20 mg/m ³
	5 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Potential for cutaneous absorption
Estonia - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm

1-Methyl-2-pyrrolidone (872-50-4)	
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Skin notation
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	14 mg/m ³
	3.5 ppm
HTP (OEL STEL)	80 mg/m ³
	20 ppm
OEL chemical category	Potential for cutaneous absorption
Finland - Biological limit values	
BLV	8 µmol/mol Creatinine Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone - Medium: urine - Sampling time: in the morning after a working day 5 µmol/mol Creatinine Parameter: 2-Hydroxy-N-methyl-succinimide - Medium: urine - Sampling time: after the shift
France - Occupational Exposure Limits	
VME (OEL TWA)	40 mg/m ³ (indicative limit)
	10 ppm (indicative limit)
VLE (OEL C/STEL)	80 mg/m ³ (indicative limit)
	20 ppm (indicative limit)
OEL chemical category	Reproductive Toxin category 1B, Risk of cutaneous absorption
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA)	82 mg/m ³ (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-vapor)
	20 ppm (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-vapor)
Chemical category	Skin notation
Germany - Biological limit values (TRGS 903)	
Biological limit value	150 mg/l Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone - Medium: urine - Sampling time: end of shift
Gibraltar - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Skin notation
Greece - Occupational Exposure Limits	
OEL TWA	40 mg/m ³

1-Methyl-2-pyrrolidone (872-50-4)	
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	skin - potential for cutaneous absorption
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	40 mg/m ³
CK (OEL STEL)	80 mg/m ³
OEL chemical category	Potential for cutaneous absorption
Ireland - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Potential for cutaneous absorption
Italy - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	skin - potential for cutaneous absorption
Latvia - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL chemical category	skin - potential for cutaneous exposure
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	40 mg/m ³
	10 ppm
TPRV (OEL STEL)	80 mg/m ³
	20 ppm
OEL chemical category	Reproductive toxin, Skin notation
Luxembourg - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³

1-Methyl-2-pyrrolidone (872-50-4)	
	20 ppm
OEL chemical category	Possibility of significant uptake through the skin
Malta - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Possibility of significant uptake through the skin
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	40 mg/m ³
	10 ppm
TGG-15min (OEL STEL)	80 mg/m ³
	20 ppm
MAC chemical category	Skin notation
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	40 mg/m ³
NDSch (OEL STEL)	80 mg/m ³
Portugal - Occupational Exposure Limits	
OEL TWA	40 mg/m ³ (indicative limit value)
	10 ppm (indicative limit value)
OEL STEL	80 mg/m ³ (indicative limit value)
	20 ppm (indicative limit value)
OEL chemical category	skin - potential for cutaneous exposure indicative limit value
Romania - Occupational Exposure Limits	
OEL TWA	40 mg/m ³
	10 ppm
OEL STEL	80 mg/m ³
	20 ppm
OEL chemical category	Skin notation
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	40 mg/m ³
	10 ppm
NPHV (OEL C)	80 mg/m ³
OEL chemical category	Potential for cutaneous absorption

1-Methyl-2-pyrrolidone (872-50-4)	
Slovenia - Occupational Exposure Limits	
OEL TWA	40 mg/m ³ (vapor)
	10 ppm (vapor)
OEL STEL	80 mg/m ³ (vapor)
	20 ppm (vapor)
OEL chemical category	Category 1B, Potential for cutaneous absorption
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	40 mg/m ³ (indicative limit value)
	10 ppm (indicative limit value)
VLA-EC (OEL STEL)	80 mg/m ³
	20 ppm
OEL chemical category	TR1B, skin - potential for cutaneous absorption
Spain - Biological limit values	
BLV	20 mg/g creatinine Parameter: 2-Hydroxy-N-methylsuccinimide - Medium: urine - Sampling time: pre-shift 70 mg/g creatinine Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone - Medium: urine - Sampling time: between 2-4 hours after the final exposure
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	14.4 mg/m ³
	3.6 ppm
KGV (OEL STEL)	80 mg/m ³
	20 ppm
OEL chemical category	Skin notation
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	40 mg/m ³
	10 ppm
WEL STEL (OEL STEL)	80 mg/m ³
	20 ppm
WEL chemical category	Potential for cutaneous absorption
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	20 mg/m ³
	5 ppm
Korttidsverdi (OEL STEL)	80 mg/m ³ (value from the regulation)
	20 ppm (value from the regulation)
OEL chemical category	Skin notation, Potential reproductive hazard

1-Methyl-2-pyrrolidone (872-50-4)	
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	80 mg/m ³ (aerosol, vapour)
	20 ppm (aerosol, vapour)
KZGW (OEL STEL)	160 mg/m ³ (aerosol, vapour)
	40 ppm (aerosol, vapour)
OEL chemical category	Skin notation
USA - ACGIH - Biological Exposure Indices	
BEI	100 mg/l Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone - Medium: urine - Sampling time: end of shift
Chromium (7440-47-3)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Chromium metal
IOEL TWA	2 mg/m ³
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	2 mg/m ³
Belgium - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³
Bulgaria - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	2 mg/m ³
Croatia - Biological limit values	
BLV	5 µg/g creatinine Parameter: Chromium - Medium: urine - Sampling time: single sample at the end of the work shift (calculated on the average Creatinine value of 1.2 g/L urine)
Cyprus - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	0.5 mg/m ³ (dust)
Denmark - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³ (powder)
OEL STEL	1 mg/m ³ (powder)
Estonia - Occupational Exposure Limits	
OEL TWA	2 mg/m ³



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Chromium (7440-47-3)	
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	0.5 mg/m ³
France - Occupational Exposure Limits	
VME (OEL TWA)	2 mg/m ³ (indicative limit)
France - Biological limit values	
BLV	2.5 µg/l Parameter: Total Chromium - Medium: urine - Sampling time: end of shift at end of workweek (Background noise on non-exposed subjects (soluble aerosol))
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA)	2 mg/m ³ (except the one listed by name-inhalable fraction)
Gibraltar - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Greece - Occupational Exposure Limits	
OEL TWA	1 mg/m ³
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	2 mg/m ³
OEL chemical category	Sensitizer
Ireland - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
OEL STEL	6 mg/m ³ (calculated)
Italy - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³
Latvia - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Latvia - Biological Exposure Indices	
BEI	10 µg/g creatinine Parameter: Chromium - Medium: urine - Sampling time: end of shift; end of work week (population not subject to occupational exposure < 0.8 µg/L, in urine - < 0.01 µmol/L)
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	2 mg/m ³
Luxembourg - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Malta - Occupational Exposure Limits	
OEL TWA	2 mg/m ³
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	0.5 mg/m ³ (metallic)

Chromium (7440-47-3)	
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	0.5 mg/m ³
Portugal - Occupational Exposure Limits	
OEL TWA	0.5 mg/m ³ (indicative limit value (Metal))
OEL chemical category	A4 - Not Classifiable as a Human Carcinogen
Romania - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (metallic)
Romania - Biological limit values	
BLV	10 µg/g creatinine Parameter: Chromium - Medium: urine - Sampling time: during working hours 30 µg/g creatinine Parameter: Chromium - Medium: urine - Sampling time: end of work week
Slovenia - Occupational Exposure Limits	
OEL TWA	2 mg/m ³ (inhalable fraction)
OEL STEL	2 mg/m ³ (inhalable fraction)
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	2 mg/m ³ (indicative limit value)
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	0.5 mg/m ³ (total dust)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	0.5 mg/m ³
WEL STEL (OEL STEL)	1.5 mg/m ³ (calculated)
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	0.5 mg/m ³
Korttidsverdi (OEL STEL)	1.5 mg/m ³ (value calculated)
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	0.5 mg/m ³ (inhalable dust)
OEL chemical category	Sensitizer
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	0.5 mg/m ³ (inhalable particulate matter)
USA - ACGIH - Biological Exposure Indices	
BEI	0.7 µg/l Parameter: total Chromium - Medium: urine - Sampling time: end of shift at end of workweek (population based)
Ethylbenzene (100-41-4)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Ethylbenzene

Ethylbenzene (100-41-4)	
IOEL TWA	442 mg/m ³
	100 ppm
IOEL STEL	884 mg/m ³
	200 ppm
Remark	Possibility of significant uptake through the skin
Regulatory reference	COMMISSION DIRECTIVE 2000/39/EC
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	440 mg/m ³
	100 ppm
MAK (OEL STEL)	880 mg/m ³
	200 ppm
OEL chemical category	Skin notation
Belgium - Occupational Exposure Limits	
OEL TWA	87 mg/m ³
	20 ppm
OEL STEL	551 mg/m ³
	125 ppm
OEL chemical category	Skin, Skin notation
Bulgaria - Occupational Exposure Limits	
OEL TWA	435 mg/m ³
OEL STEL	545 mg/m ³
Bulgaria - Biological limit values	
BLV	2000 mg/g creatinine Parameter: Mandelic acid and Phenylglyoxylic acid - total - Medium: urine - Sampling time: at the end of exposure or end of work shift (possible significant absorption through the skin)
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	442 mg/m ³
	100 ppm
KGVI (OEL STEL)	884 mg/m ³
	200 ppm
OEL chemical category	Skin notation
Croatia - Biological limit values	
BLV	1.5 mg/l Parameter: Ethylbenzene - Medium: blood - Sampling time: during exposure 1.5 g/g creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: at the end of the work shift and at the end of the working week (calculated on the average Creatinine value of 1.2 g/L urine)

Ethylbenzene (100-41-4)	
Cyprus - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Skin-potential for cutaneous absorption
Czech Republic - Occupational Exposure Limits	
PEL (OEL TWA)	200 mg/m ³
OEL chemical category	Potential for cutaneous absorption
Czech Republic - Biological limit values	
BLV	1100 µmol/mmol Creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: end of shift 1500 mg/g creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: end of shift
Denmark - Occupational Exposure Limits	
OEL TWA	217 mg/m ³
	50 ppm
OEL STEL	434 mg/m ³
	100 ppm
OEL chemical category	Potential for cutaneous absorption
Estonia - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Skin notation, Sensitizer
Finland - Occupational Exposure Limits	
HTP (OEL TWA)	220 mg/m ³
	50 ppm
HTP (OEL STEL)	880 mg/m ³
	200 ppm
OEL chemical category	Potential for cutaneous absorption
Finland - Biological limit values	
BLV	Parameter: Mandelic acid - Medium: urine - Sampling time: after the shift after a working week or exposure period

Ethylbenzene (100-41-4)	
France - Occupational Exposure Limits	
VME (OEL TWA)	88.4 mg/m ³ (restrictive limit)
	20 ppm (restrictive limit)
VLE (OEL C/STEL)	442 mg/m ³ (restrictive limit)
	100 ppm (restrictive limit)
OEL chemical category	Risk of cutaneous absorption
France - Biological limit values	
BLV	Parameter: Mandelic acid - Medium: urine - Sampling time: end of shift at end of workweek (per the Authority, the values for this substance must be decided and/or determined on a case by case basis. Guidance for the calculation of and interpretation of values is provided in the source)
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA)	88 mg/m ³ (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
	20 ppm (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Chemical category	Skin notation
Germany - Biological limit values (TRGS 903)	
Biological limit value	250 mg/g creatinine Parameter: Mandelic acid plus Phenylglyoxylic acid - Medium: urine - Sampling time: end of shift
Gibraltar - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Skin notation
Greece - Occupational Exposure Limits	
OEL TWA	435 mg/m ³
	100 ppm
OEL STEL	545 mg/m ³
	125 ppm
Hungary - Occupational Exposure Limits	
AK (OEL TWA)	442 mg/m ³
CK (OEL STEL)	884 mg/m ³
OEL chemical category	Potential for cutaneous absorption
Ireland - Occupational Exposure Limits	
OEL TWA	442 mg/m ³

Ethylbenzene (100-41-4)	
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Potential for cutaneous absorption
Italy - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	skin - potential for cutaneous absorption
Latvia - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL chemical category	skin - potential for cutaneous exposure
Lithuania - Occupational Exposure Limits	
IPRV (OEL TWA)	442 mg/m ³
	100 ppm
TPRV (OEL STEL)	884 mg/m ³
	200 ppm
OEL chemical category	Skin notation
Luxembourg - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Possibility of significant uptake through the skin
Malta - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Possibility of significant uptake through the skin
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	215 mg/m ³



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Ethylbenzene (100-41-4)	
	48.6 ppm
TGG-15min (OEL STEL)	430 mg/m ³
	97.3 ppm
MAC chemical category	Skin notation
Poland - Occupational Exposure Limits	
NDS (OEL TWA)	200 mg/m ³
NDSch (OEL STEL)	400 mg/m ³
Portugal - Occupational Exposure Limits	
OEL TWA	442 mg/m ³ (indicative limit value)
	100 ppm (indicative limit value)
OEL STEL	884 mg/m ³ (indicative limit value)
	200 ppm (indicative limit value)
OEL chemical category	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans, skin - potential for cutaneous exposure indicative limit value
Romania - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Skin notation
Romania - Biological limit values	
BLV	1.5 g/g creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: end of work week
Slovakia - Occupational Exposure Limits	
NPHV (OEL TWA)	442 mg/m ³
	100 ppm
NPHV (OEL C)	884 mg/m ³
OEL chemical category	Potential for cutaneous absorption
Slovakia - Biological limit values	
BLV	12 mg/l Parameter: 2 and 4-Ethylphenol - Medium: urine - Sampling time: end of exposure or work shift (also after all work shifts for long-term exposure) 1600 mg/l Parameter: Mandelic acid and Phenylglycolic acid - Medium: urine - Sampling time: end of exposure or work shift (also after all work shifts for long-term exposure)
Slovenia - Occupational Exposure Limits	
OEL TWA	442 mg/m ³
	100 ppm

Ethylbenzene (100-41-4)	
OEL STEL	884 mg/m ³
	200 ppm
OEL chemical category	Potential for cutaneous absorption
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	441 mg/m ³ (indicative limit value)
	100 ppm (indicative limit value)
VLA-EC (OEL STEL)	884 mg/m ³
	200 ppm
OEL chemical category	skin - potential for cutaneous absorption
Spain - Biological limit values	
BLV	700 mg/g creatinine Parameter: Mandelic acid plus Phenylglyoxylic acid - Medium: urine - Sampling time: end of workweek
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	220 mg/m ³
	50 ppm
KGV (OEL STEL)	884 mg/m ³
	200 ppm
OEL chemical category	Skin notation
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	441 mg/m ³
	100 ppm
WEL STEL (OEL STEL)	552 mg/m ³
	125 ppm
WEL chemical category	Potential for cutaneous absorption
Norway - Occupational Exposure Limits	
Grenseverdi (OEL TWA)	20 mg/m ³
	5 ppm
Korttidsverdi (OEL STEL)	30 mg/m ³ (value calculated)
	10 ppm (value calculated)
OEL chemical category	Skin notation, Carcinogen
Switzerland - Occupational Exposure Limits	
MAK (OEL TWA)	220 mg/m ³
	50 ppm
KZGW (OEL STEL)	220 mg/m ³
	50 ppm

Ethylbenzene (100-41-4)	
OEL chemical category	Skin notation
Switzerland - BAT	
BAT	600 mg/g creatinine Parameter: Mandelic acid and Phenylglyoxylacid - Medium: urine - Sampling time: end of shift (see also Styrene)
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	20 ppm
ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans
USA - ACGIH - Biological Exposure Indices	
BEI	0.15 g/g creatinine Parameter: Sum of mandelic acid and phenylglyoxylic acid - Medium: urine - Sampling time: end of shift (nonspecific)

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

8.2.2. Personal protection equipment

8.2.2.1. Eye and face protection

Eye protection:

Safety glasses

8.2.2.2. Skin protection

Skin and body protection:

Wear suitable protective clothing

Hand protection:

Protective gloves

8.2.2.3. Respiratory protection

Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

Environmental exposure controls:

Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Colour	: Not available
Odour	: Not available
Odour threshold	: Not available
Melting point	: Not available
Freezing point	: Not applicable
Boiling point	: Not available
Flammability	: Non flammable.
Lower explosion limit	: Not applicable
Upper explosion limit	: Not applicable
Flash point	: Not applicable
Auto-ignition temperature	: Not applicable
Decomposition temperature	: Not available
pH	: Not available
pH solution	: Not available
Viscosity, kinematic	: Not applicable
Solubility	: Not available
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: Not available
Vapour pressure at 50°C	: Not available
Density	: Not available
Relative density	: Not available
Relative vapour density at 20°C	: Not applicable
Particle size	: Not available

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity (oral) : Not classified
 Acute toxicity (dermal) : Not classified
 Acute toxicity (inhalation) : Not classified

Graphite (7782-42-5)	
LC50 Inhalation - Rat	> 2000 mg/m ³ (Exposure time: 4 h Source: ECHA)
Iron (7439-89-6)	
LD50 oral rat	30 g/kg (Source: NLM_CIP)
Cobaltate (CoO21-), lithium (12190-79-3)	
LD50 oral rat	> 5000 mg/kg (Source: ECHA)
LD50 dermal rat	> 2000 mg/kg (Source: ECHA)
LC50 Inhalation - Rat	> 5.05 mg/l/4h
Propanoic acid, methyl ester (554-12-1)	
LD50 oral rat	5 g/kg (Source: NLM_CIP)
LC50 Inhalation - Rat	> 22.7 mg/l/4h
Phosphate(1-), hexafluoro-, lithium (21324-40-3)	
LD50 oral rat	50 – 300 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method), Guideline: EU Method B.1 tris (Acute Oral Toxicity - Acute Toxic Class Method), Guideline: EPA OPPTS 870.1100 (Acute Oral Toxicity)
4-Fluoro-1,3-dioxolan-2-one (114435-02-8)	
LD50 dermal rat	> 2000 mg/kg (Source: ECHA_API)
Dimethyl carbonate (616-38-6)	
LD50 oral rat	> 5000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity)
LD50 dermal rabbit	> 2000 mg/kg bodyweight Animal: rabbit
LC50 Inhalation - Rat	> 5.36 mg/l air Animal: rat, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity)
Ethene, homopolymer (9002-88-4)	
LD50 oral rat	> 8 g/kg (Source: NLM_HSDB)

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Iron oxide (Fe₂O₃) (1309-37-1)	
LD50 oral rat	> 10000 mg/kg (Source: IUCLID)
Boehmite (1318-23-6)	
LD50 oral rat	> 5050 mg/kg (Source: IUCLID)
LC50 Inhalation - Rat	> 5.09 mg/l/4h
LC50 Inhalation - Rat (Dust/Mist)	> 2.3 mg/l/4h
Carbon black (1333-86-4)	
LD50 oral rat	> 15400 mg/kg (Source: NLM_CIP)
LD50 dermal rabbit	> 8000 mg/kg Source: ECHA
LC50 Inhalation - Rat	> 4.6 mg/m ³ (Exposure time: 4 h Source: ECHA_API)
Nickel (7440-02-0)	
LD50 oral rat	> 9000 mg/kg (Source: EU_RAR)
LC50 Inhalation - Rat	> 10.2 mg/l (Exposure time: 1 h Source: EU_RAR)
1-Methyl-2-pyrrolidone (872-50-4)	
LD50 oral rat	3914 mg/kg (Source: NLM_CIP)
LD50 dermal rat	> 5000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LD50 dermal rabbit	8 g/kg (Source: NLM_CIP)
LC50 Inhalation - Rat	> 5.1 mg/l/4h
Chromium (7440-47-3)	
LD50 oral rat	> 5000 mg/kg bodyweight
LC50 Inhalation - Rat	> 5.41 mg/l/4h
Lithium carbonate (554-13-2)	
LD50 oral rat	525 mg/kg (Source: NLM_CIP)
LD50 dermal rabbit	> 3000 mg/kg (Source: ECHA_API)
LC50 Inhalation - Rat	> 2.17 mg/l/4h
Ethylbenzene (100-41-4)	
LD50 oral rat	3500 mg/kg (Source: JAPAN_GHS)
LD50 dermal rabbit	15400 mg/kg (Source: JAPAN_GHS)
LC50 Inhalation - Rat	17.4 mg/l/4h
LC50 Inhalation - Rat [ppm]	4000 ppm Source: ECHA, Harmonized classification of EU CLP
Skin corrosion/irritation	: Not classified
Serious eye damage/irritation	: Not classified
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified

Reproductive toxicity : Not classified
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties : The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or substance(s) are not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %

11.2.2. Other information

Other information : No information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.

Hazardous to the aquatic environment, short-term (acute) : Not classified

Hazardous to the aquatic environment, long-term (chronic) : Not classified

Graphite (7782-42-5)	
LC50 - Fish [1]	> 100 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio)
EC50 - Crustacea [1]	> 100 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	19 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
EC50 72h - Algae [2]	7.2 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
NOEC (chronic)	47 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
Copper (7440-50-8)	
LC50 - Fish [1]	0.0068 – 0.0156 mg/l (Exposure time: 96 h - Species: Pimephales promelas Source: EPA)
LC50 - Fish [2]	< 0.3 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: EPA)
EC50 - Crustacea [1]	0.03 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 72h - Algae [1]	0.0426 – 0.0535 mg/l (Species: Pseudokirchneriella subcapitata [static])
EC50 96h - Algae [1]	0.031 – 0.054 mg/l (Species: Pseudokirchneriella subcapitata [static])
Phosphate(1-), hexafluoro-, lithium (21324-40-3)	
EC50 96h - Algae [1]	> 100 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)

Phosphate(1-), hexafluoro-, lithium (21324-40-3)	
NOEC chronic fish	4 mg/l Test organisms (species): Duration: '21 d'
Dimethyl carbonate (616-38-6)	
LC50 - Fish [1]	≥ 100 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio)
EC50 - Crustacea [1]	> 100 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	> 100 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
NOEC (chronic)	25 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
Iron oxide (Fe2O3) (1309-37-1)	
LC50 - Fish [1]	100000 mg/l (Exposure time: 96 h - Species: Danio rerio [static] Source: ECHA)
Boehmite (1318-23-6)	
LC50 - Fish [1]	> 100 mg/l (Exposure time: 96 h - Species: Pimephales promelas [semi-static] Source: IUCLID)
LC50 - Fish [2]	> 100 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static] Source: IUCLID)
EC50 - Crustacea [1]	> 100 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 72h - Algae [1]	> 100 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
Carbon black (1333-86-4)	
LC50 - Fish [1]	> 1000 mg/l
EC50 - Crustacea [1]	> 1000 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	> 10000 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
EC50 72h - Algae [2]	> 10000 mg/l Test organisms (species):
ErC50 algae	> 10000 mg/l Source: EHCA
Nickel (7440-02-0)	
LC50 - Fish [1]	> 100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio Source: IUCLID)
LC50 - Fish [2]	1.3 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static] Source: EPA)
EC50 - Crustacea [1]	> 100 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 - Crustacea [2]	1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 72h - Algae [1]	0.18 mg/l (Species: Pseudokirchneriella subcapitata)
EC50 96h - Algae [1]	0.174 – 0.311 mg/l (Species: Pseudokirchneriella subcapitata [static])
1-Methyl-2-pyrrolidone (872-50-4)	
LC50 - Fish [1]	832 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static] Source: IUCLID)

1-Methyl-2-pyrrolidone (872-50-4)	
LC50 - Fish [2]	1072 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: IUCLID)
EC50 - Crustacea [1]	4897 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 72h - Algae [1]	> 500 mg/l (Species: Desmodesmus subspicatus)
EC50 72h - Algae [2]	> 500 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
LOEC (chronic)	25 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC (chronic)	12.5 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
Lithium carbonate (554-13-2)	
LC50 - Fish [1]	30.3 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static] Source: ECHA)
Ethylbenzene (100-41-4)	
LC50 - Fish [1]	11 – 18 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static] Source: EPA)
LC50 - Fish [2]	4.2 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static] Source: EPA)
EC50 - Crustacea [1]	1.8 – 2.4 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 72h - Algae [1]	4.6 mg/l (Species: Pseudokirchneriella subcapitata)
EC50 72h - Algae [2]	2.6 – 11.3 mg/l (Species: Pseudokirchneriella subcapitata [static])
EC50 96h - Algae [1]	> 438 mg/l (Species: Pseudokirchneriella subcapitata)
EC50 96h - Algae [2]	1.7 – 7.6 mg/l (Species: Pseudokirchneriella subcapitata [static])
12.2. Persistence and degradability	
No additional information available	
12.3. Bioaccumulative potential	
Lithium nickel oxide (Li₂NiO₂) (12325-84-7)	
Bioaccumulative potential	No information available.
Cobaltate (CoO₂·), lithium (12190-79-3)	
Bioaccumulative potential	No information available.
Propanoic acid, methyl ester (554-12-1)	
Partition coefficient n-octanol/water (Log Pow)	0.8 (at 26.6 °C)
4-Fluoro-1,3-dioxolan-2-one (114435-02-8)	
Partition coefficient n-octanol/water (Log Pow)	-0.435 (at 20.1 °C (at pH >3.6-<4.1)
Dimethyl carbonate (616-38-6)	
Partition coefficient n-octanol/water (Log Pow)	0.354 (at 20 °C (at pH >6.5-<7.5)

Boehmite (1318-23-6)	
BCF - Fish [1]	50 – 231
1-Methyl-2-pyrrolidone (872-50-4)	
Partition coefficient n-octanol/water (Log Pow)	-0.46 (at 25 °C)
Lithium carbonate (554-13-2)	
BCF - Fish [1]	(no bioaccumulation)
Ethylbenzene (100-41-4)	
BCF - Fish [1]	(15 dimensionless)
Partition coefficient n-octanol/water (Log Pow)	3.6 (at 20 °C (at pH 7.84)

12.4. Mobility in soil

Lithium nickel oxide (Li₂NiO₂) (12325-84-7)	
Ecology - soil	No information available.
Cobaltate (CoO₂), lithium (12190-79-3)	
Ecology - soil	Slightly soluble in water.

12.5. Results of PBT and vPvB assessment

LITHIUM ION BATTERIES	
This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII	
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII	

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties : The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or substance(s) are not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %.

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Contaminated packaging : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Additional information : No additional information available

SECTION 14: Transport information

The product can be shipped in two ways. When it is shipped alone, the UN number is 3480. When it is shipped in equipment, the UN number is 3481.

PART I (shipped alone)

In accordance with ADR / IMDG(IMDG CODE 41-22) / IATA (DGR 65th) / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
UN 3480	UN 3480	UN 3480	UN 3480	UN 3480
14.2. UN proper shipping name				
LITHIUM ION BATTERIES	LITHIUM ION BATTERIES	Lithium ion batteries	LITHIUM ION BATTERIES	LITHIUM ION BATTERIES
Transport document description				
UN 3480 LITHIUM ION BATTERIES, 9, (E)	UN 3480 LITHIUM ION BATTERIES, 9	UN 3480 Lithium ion batteries, 9	UN 3480 LITHIUM ION BATTERIES, 9	UN 3480 LITHIUM ION BATTERIES, 9
14.3. Transport hazard class(es)				
9	9	9	9	9
				
14.4. Packing group				
Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
14.5. Environmental hazards				
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No	Dangerous for the environment: No	Dangerous for the environment: No
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR) : M4
Special provisions (ADR) : 188, 230, 310, 348, 376, 377, 387, 636
Limited quantities (ADR) : 0
Excepted quantities (ADR) : E0
Packing instructions (ADR) : P903, P908, P909, P910, P911, LP903, LP904, LP905, LP906
Transport category (ADR) : 2
Tunnel restriction code (ADR) : E
EAC code : 2Y

Transport by sea

Special provisions (IMDG) : 188, 230, 310, 348, 376, 377, 384, 387
Limited quantities (IMDG) : 0
Excepted quantities (IMDG) : E0
Packing instructions (IMDG) : P903, P908, P909, P910, P911, LP903, LP904, LP905, LP906
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-I

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Stowage category (IMDG) : A
Stowage and handling (IMDG) : SW19
Properties and observations (IMDG) : Electrical batteries containing lithium ion encased in a rigid metallic body. Lithium ion batteries may also be shipped in, or packed with, equipment. Electrical lithium batteries may cause fire due to an explosive rupture of the body caused by improper construction or reaction with contaminants.

Air transport

PCA Excepted quantities (IATA) : E0
PCA Limited quantities (IATA) : Forbidden
PCA limited quantity max net quantity (IATA) : Forbidden
PCA packing instructions (IATA) : Forbidden
PCA max net quantity (IATA) : Forbidden
CAO packing instructions (IATA) : See 965
CAO max net quantity (IATA) : See 965
Special provisions (IATA) : A88, A99, A154, A164, A183, A201, A213, A331, A334, A802
ERG code (IATA) : 12FZ

Inland waterway transport

Classification code (ADN) : M4
Special provisions (ADN) : 188, 230, 310, 348, 376, 377, 387, 636
Limited quantities (ADN) : 0
Excepted quantities (ADN) : E0
Equipment required (ADN) : PP
Number of blue cones/lights (ADN) : 0

Rail transport

Classification code (RID) : M4
Special provisions (RID) : 188, 230, 310, 348, 376, 377, 387, 636
Limited quantities (RID) : 0
Excepted quantities (RID) : E0
Packing instructions (RID) : P903, 908, 909, P910, P911, LP903, LP904, LP905, LP906
Transport category (RID) : 2
Colis express (express parcels) (RID) : CE2
Hazard identification number (RID) : 90

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

PART 2(shipped in equipment)

In accordance with ADR / IMDG(IMDG CODE 41-22) / IATA (DGR 65th) / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
UN 3481	UN 3481	UN 3481	UN 3481	UN 3481
14.2. UN proper shipping name				
LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT	Lithium ion batteries contained in equipment	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT

ADR	IMDG	IATA	ADN	RID
Transport document description				
UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9, (E)	UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9	UN 3481 Lithium ion batteries contained in equipment, 9	UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9	UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9
14.3. Transport hazard class(es)				
9	9	9	9	9
				
14.4. Packing group				
Not applicable.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
14.5. Environmental hazards				
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No	Dangerous for the environment: No	Dangerous for the environment: No
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR) : M4
Special provisions (ADR) : 188, 230, 310, 348, 360, 376, 377, 387, 390, 670
Limited quantities (ADR) : 0
Excepted quantities (ADR) : E0
Packing instructions (ADR) : P903, P908, P909, P910, P911, LP903, LP904, LP905, LP906
Transport category (ADR) : 2
Tunnel restriction code (ADR) : E
EAC code : 2Y

Transport by sea

Special provisions (IMDG) : 188, 230, 310, 348, 360, 376, 377, 384, 387, 390
Limited quantities (IMDG) : 0
Excepted quantities (IMDG) : E0
Packing instructions (IMDG) : P903, P908, P909, P910, P911, LP903, LP904, LP905, LP906
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-I
Stowage category (IMDG) : A
Stowage and handling (IMDG) : SW19
Properties and observations (IMDG) : Electrical batteries containing lithium ion encased in a rigid metallic body. Lithium ion batteries may also be shipped in, or packed with, equipment. Electrical lithium batteries may cause fire due to an explosive rupture of the body caused by improper construction or reaction with contaminants.

Air transport

PCA Excepted quantities (IATA) : E0
PCA Limited quantities (IATA) : Forbidden
PCA limited quantity max net quantity (IATA) : Forbidden

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PCA packing instructions (IATA) : 967
PCA max net quantity (IATA) : 5kg
CAO packing instructions (IATA) : 967
CAO max net quantity (IATA) : 35kg
Special provisions (IATA) : A48, A88, A99, A154, A164, A181, A185, A213, A220
ERG code (IATA) : 12FZ

Inland waterway transport

Classification code (ADN) : M4
Special provisions (ADN) : 188, 230, 310, 348, 360, 376, 377, 387, 390, 670
Limited quantities (ADN) : 0
Excepted quantities (ADN) : E0
Equipment required (ADN) : PP
Number of blue cones/lights (ADN) : 0

Rail transport

Classification code (RID) : M4
Special provisions (RID) : 188, 230, 310, 348, 360, 376, 377, 387, 390, 670
Limited quantities (RID) : 0
Excepted quantities (RID) : E0
Packing instructions (RID) : P903, 908, 909, P910, P911, LP903, LP904, LP905, LP906
Transport category (RID) : 2
Colis express (express parcels) (RID) : CE2
Hazard identification number (RID) : 90

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****15.1.1. EU-Regulations****REACH Candidate List (SVHC)**

Contains substance(s) listed on the REACH Candidate List in concentrations above or equal to 0.1 %: 1-Methyl-2-pyrrolidone (NMP) (EC 212-828-1, CAS 872-50-4)

PIC Regulation (Prior Informed Consent)

Contains no substance(s) listed on the PIC list (Regulation EU 649/2012 concerning the export and import of hazardous chemicals)

POP Regulation (Persistent Organic Pollutants)

Contains no substance(s) listed on the POP list (Regulation EU 2019/1021 on persistent organic pollutants)

Ozone Regulation (1005/2009)

Contains no substance(s) listed on the Ozone Depletion list (Regulation EU 1005/2009 on substances that deplete the ozone layer)

Dual-Use Regulation (428/2009)

Contains substance(s) listed on the COUNCIL REGULATION (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items: Graphite (7782-42-5), Aluminium powder (7429-90-5), Nickel powder (7440-02-0)

Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Abbreviations and acronyms:	
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)



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Abbreviations and acronyms:	
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disrupting properties

Data sources : LOLI. ECHA reference.
Training advice : Normal use of this product shall imply use in accordance with the instructions on the packaging.
Other information : No information available.

Full text of H- and EUH-statements:	
H225	Highly flammable liquid and vapour.
H228	Flammable solid.
H261	In contact with water releases flammable gases.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
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.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H360D	May damage the unborn child.
H360Fd	May damage fertility. Suspected of damaging the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

-----End of Report-----

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