



Technical Report No. 68.413.24.0016.01A  
Rev.01  
Dated 2024-02-29

## 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

TOV SOD Certification and Testing (China) Co., Ltd. Shenzhen Branch  
TOV SOD Group

Prepared by:

*Elsa Deng*

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Project Handler



Reviewed by:

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Scarlett Liang  
Designated Reviewer

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Disclaimer Measurement Uncertainty: Unless otherwise agreed upon, pass or fail verdicts are given based on the measured values without consideration of measurement uncertainties. Please note, every test method has a measurement uncertainty which has been evaluated by the laboratory according to ISO IEC 17025 requirements. By taking measurement uncertainties into account it might happen that measured values can neither be assessed as pass or fail.

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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 PST and/or vPvB substances  $\geq$  0.1% assessed in accordance with REACH Annex XIII

The mixture does not contain substance(s) included in the 1st 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 <sub>2</sub> NiO <sub>2</sub> ) | CAS-No.: 12325-84-7   | 25 - 35 | Not classified  |
| Graphite   | CAS-No.: 7782-42-5<br>EC-No.: 231-955-3<br>REACH-no: No information available | 20 - 30 | Not classified  |
| Iron   | CAS-No.: 7439-89-6<br>EC-No.: 215-168-2;231-096-4                             | 10 - 20 | Not classified  |
| Copper   | CAS-No.: 7440-50-8<br>EC-No.: 231-159-6<br>EC Index-No.: 029-024-00-X         | 5 - 15  | Aquatic Ctronic 2, H411   |
| Cobaltate (CoO <sub>2</sub> ), lithium                   | CAS-No.: 12190-79-3<br>EC-No.: 235-362-0                                      | 1 - 5   | Repr. 1B, H360Fd  |
| Propanolc acid, methyl ester                             | CAS-No.: 554-12-1<br>EC-No.: 209-060-4<br>EC Index-No.: 607-027-00-2          | 1 - 5   | Flam. Liq. 2, H225<br>Acute Tox. 4 (Inhalation), H332   |
| Aluminum   | CAS-No.: 7429-90-5<br>EC-No.: 231-072-3<br>EC Index-No.: 013-002-00-1         | 1 - 5   | Flam. Sol. 1, H228<br>Water-react. 2, H261  |
| Phosphate(1-), hexafluoro-, lithium                      | CAS-No.: 21324-40-3<br>EC-No.: 244-334-7                                      | 1 - 3   | Acute Tox. 3 (Oral), H301<br>Skin Corr. 1A, H314<br>Eye Dam.1. H318<br>STOT RE 1, H372                          |
| 4-Fluoro-1,3-dioxolan-2-one                              | CAS-No.: 114435-02-8<br>EC-No.: 483-360-5;601-313-0                           | 1 - 3   | Acute Tox. 4 (Oral), H302<br>Skin Irrit. 2, H315<br>Eye Irrit. 2, H319<br>Skin Sens. 1, H317<br>STOT RE 1, H372 |
| Dimethyl carbonate                                       | CAS-No.: 616-38-6<br>EC-No.: 210-478-4<br>EC Index-No.: 607-013-00-6          | 1 - 3   | Flam. Liq. 2, H225  |
| Ethene, homopolymer                                      | CAS-No.: 9002-88-4<br>EC-No.: 618-339-3                                       | 1 - 3   | Not classified  |
| Iron oxide (Fe <sub>2</sub> O <sub>3</sub> )             | CAS-No.: 1309-37-1<br>EC-No.: 215-168-2                                       | 0.1 - 1 | Not classified  |
| Boehmite   | CAS-No.: 1318-23-6<br>EC-No.: 215-284-3<br>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<br>EC-No.: 215-609-9;435-640-3                     | 0.1 - 1 | Not classified  |
| Nickel  | CAS-No.: 7440-02-0<br>EC-No.: 231-111-4<br>EC Index-No.: 028-002-00-7 | 0.1 - 1 | Skin Sens. 1, H317<br>Care. 2, H351<br>STOT RE 1, H372  |
| 1-Methyl-2-pyrrolidone substance listed as REACH Candidate (1-Methyl-2-imidazolidone (NMP)) | CAS-No.: 872-50-4<br>EC-No.: 212-828-1<br>EC Index-No.: 606-021-00-7  | 0.1 - 1 | Skin Init. 2, H315<br>Eye Irrit. 2, H319<br>Repr. 1B, H3600<br>STOT SE 3, H335                |
| Aluminum lithium oxide (ALiO)   | CAS-No.: 11089-89-7   | 0.1 - 1 | Not classified  |
| Chromium  | CAS-No.: 7440-47-3<br>EC-No.: 231-157-5                               | 0.1 - 1 | Not classified  |
| Lithium carbonate   | CAS-No.: 554-13-2<br>EC-No.: 209-062-5                                | 0.1 - 1 | Not classified  |
| Ethylbenzene  | CAS-No.: 10041-4<br>EC-No.: 202-849-4<br>EC Index-No.: 601-023-00-4   | 0.1 - 1 | Flam. Liq. 2, H225<br>Acute Tox. 4 (Inhalation), H332<br>STOT RE 2, H373<br>Asp. Tox. 1, H304 |

| Specific concentration limit&: |  |                                   |
|--------------------------------|--|-----------------------------------|
| Name                           | Product Identifier   | Specific concentration limits (%) |
| 1-Methyl-2-pyrrolidone         | CAS-No.: 872-50-4<br>EC-No.: 212-828-1<br>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.

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



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



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|  |  |
|--|--|
| Graphite (7782-42-5)                       |  |
| WEL STEL (OEL STEL)                        | 30 mg/m <sup>3</sup> (calculated-inhalable dust)<br>12 mg/m <sup>3</sup> (calculated-respirable dust)  |
| Norway - Occupational Exposure Limits      |  |
| Grenseverdi (OEL TWA)                      | 5 mg/m <sup>3</sup> (natural-total dust)<br>2 mg/m <sup>3</sup> (natural-respirable dust)<br>10 mg/m <sup>3</sup> (synthetic-total dust)<br>4 mg/m <sup>3</sup> (synthetic-respirable dust)  |
| Korttidsverdi (OEL STEL)                   | 10 mg/m <sup>3</sup> (natural-total dust)<br>4 mg/m <sup>3</sup> (natural-respirable dust)<br>20 mg/m <sup>3</sup> (synthetic-total dust)<br>8 mg/m <sup>3</sup> (synthetic-respirable dust) |
| Switzerland - Occupational Exposure Limits |  |
| MAK (OEL TWA)                              | 3 mg/m <sup>3</sup> (natural-respirable dust)<br>3 mg/m <sup>3</sup> (total dust limit values-respirable fraction)<br>10 mg/m <sup>3</sup> (total dust limit values-inhalable fraction)      |
| USA - ACGIH - Occupational Exposure Limits |  |
| ACGIH OEL TWA                              | 2 mg/m <sup>3</sup> (all forms except graphite fibers-respirable particulate matter)   |
| Iron (7439-89-6)                           |  |
| Bulgaria - Occupational Exposure Limits    |  |
| OEL TWA                                    | 6 mg/m <sup>3</sup> (containing <2% free Crystalline silicon dioxide in respirable fraction-dust, inhalable fraction)  |
| Slovakia - Occupational Exposure Limits    |  |
| NPHV (OEL TWA)                             | 6 mg/m <sup>3</sup> (total aerosol)  |
| Copper (7440-50-9)                         |  |
| Austria - Occupational Exposure Limits     |  |
| MAK (OEL TWA)                              | 1 mg/m <sup>3</sup> (inhalable fraction)<br>0.1 mg/m <sup>3</sup> (respirable fraction, smoke)   |
| MAK (OEL STEL)                             | 4 mg/m <sup>3</sup> (inhalable fraction)<br>0.4 mg/m <sup>3</sup> (respirable fraction, smoke)   |
| Belgium - Occupational Exposure Limits     |  |
| OEL TWA                                    | 0.2 mg/m <sup>3</sup> (fume)<br>1 mg/m <sup>3</sup> (dust and mist)  |
| Bulgaria - Occupational Exposure Limits    |  |
| OEL TWA                                    | 0.1 mg/m <sup>3</sup> (metal vapor)  |
| Croatia - Occupational Exposure Limits     |  |
| GM (OEL TWA)                               | 0.2 mg/m <sup>3</sup> (fume)<br>1 mg/m <sup>3</sup> (dust)   |
| KGM (OEL STEL)                             | 2 mg/m <sup>3</sup> (dust)   |



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

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| <b>Copper (7440-50-8)</b>                     |  |
|---|--|
| Poland - Occupational Exposure Limits         |  |
| NOS (OEL IWA)                                 | 0.2 mg/m <sup>3</sup>  |
| Portugal • Occupational Exposure Limits       |  |
| OEL TWA                                       | 0.2 mg/m <sup>3</sup> (fume)<br>1 mg/m <sup>3</sup> (dust; mist)                             |
| Romania - Occupational Exposure Limits        |  |
| OEL TWA                                       | 0.5 mg/m <sup>3</sup> (dust)   |
| OEL STEL                                      | 0.2 mg/m <sup>3</sup> (fume)<br>1.5 mg/m <sup>3</sup> (dust)                                 |
| Slovakia • Occupational Exposure Limits       |  |
| NPHV (OEL TWA)                                | 1 mg/m <sup>3</sup> (inhalable fraction)<br>0.2 mg/m <sup>3</sup> (respirable fraction)      |
| Spain - Occupational Exposure Limits          |  |
| V.I.A-ED (OEL TWA)                            | 0.01 mg/m <sup>3</sup> (see UNE EN 481.1995 on workplace atmospheres-respirable fraction)    |
| Sweden - Occupational Exposure Limits         |  |
| NGV (OEL TWA)                                 | 0.01 mg/m <sup>3</sup> (respirable fraction)   |
| United Kingdom - Occupational Exposure Limits |  |
| WEL TWA (OEL TWA)                             | 1 mg/m <sup>3</sup> (dust and mists)<br>0.2 mg/m <sup>3</sup> (fume)                         |
| WEL STEL (OEL STEL)                           | 0.6 mg/m <sup>3</sup> (calculated-fume)<br>2 mg/m <sup>3</sup> (dust and mist)               |
| Norway - Occupational Exposure Limits         |  |
| Grenseverdi (OEL TWA)                         | 0.1 mg/m <sup>3</sup> (fume)<br>1 mg/m <sup>3</sup> (dust)                                   |
| Korttidsverdi (OEL STEL)                      | 3 mg/m <sup>3</sup> (value calculated-dust)<br>0.3 mg/m <sup>3</sup> (value calculated-fume) |
| Switzerland • Occupational Exposure Limits    |  |
| MAK (OEL IWA)                                 | 0.1 mg/m <sup>3</sup> (Inhalable dust)   |
| KZGW (OEL STEL)                               | 0.2 mg/m <sup>3</sup> (inhalable dust)   |
| USA -ACGIH - Occupational Exposure Limits     |  |
| ACGIH OEL TWA                                 | 0.2 mg/m <sup>3</sup> (fume)   |
| <b>Aluminum (7429-90-5)</b>                   |  |
| Austria - Occupational Exposure Limits        |  |
| MAK (OEL TWA)                                 | 10 mg/m <sup>3</sup> (inhalable fraction)  |
| MAK (OEL STEL)                                | 20 mg/m <sup>3</sup> (inhalable fraction)  |

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|  |   |
|--|---|
| <b>Aluminum {7429-80-5}</b>                              |   |
| <b>Belgium • Occupational Exposure Limits</b>            |   |
| OEL TWA  | 1 mg/m <sup>3</sup>   |
| <b>Bulgaria - Occupational Exposure Limits</b>           |   |
| OEL TWA  | 10 mg/m <sup>3</sup> (inhalable fraction)<br>1.5 mg/m <sup>3</sup> (respirable fraction)  |
| <b>Croatia • Occupational Exposure Limits</b>            |   |
| GVI (OEL TWA)  | 10 mg/m <sup>3</sup> (total dust, Inhalable particles)<br>4 mg/m <sup>3</sup> (respirable dust)   |
| <b>Croatia • Biological limit values</b>                 |   |
| BLV  | 200 µg/l Parameter: Aluminum - Medium: urine - Sampling time: at the end of the work shift  |
| <b>Czech Republic - Occupational Exposure Limits</b>     |   |
| PEL (OEL TWA)  | 10 mg/m <sup>3</sup> (dust)   |
| <b>Denmark - Occupational Exposure Limits</b>            |   |
| OEL TWA  | 5 mg/m <sup>3</sup> (total, dust and powder)<br>2 mg/m <sup>3</sup> (respirable, dust and powder)   |
| OELSTEL  | 10 mg/m <sup>3</sup> (total, dust and powder)<br>4 mg/m <sup>3</sup> (respirable, dust and powder)  |
| <b>Estonia - Occupational Exposure Limits</b>            |   |
| OEL TWA  | 10 mg/m <sup>3</sup> (total dust)<br>4 mg/m <sup>3</sup> (respirable dust)  |
| <b>France • Occupational Exposure Limits</b>             |   |
| VME (OEL TWA)  | 10 mg/m <sup>3</sup> (metal)<br>5 mg/m <sup>3</sup> (dust)  |
| <b>Germany - Occupational Exposure Limits (TRGS 900)</b> |   |
| AGW (OEL TWA)  | 1.25 mg/m <sup>3</sup> (respirable fraction (dust))<br>10 mg/m <sup>3</sup> (Inhalable fraction (dust))                                       |
| <b>Germany - Biological limit values (TRGS 903)</b>      |   |
| 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 |
| <b>Greece - Occupational Exposure Limits</b>             |   |
| OEL TWA  | 10 mg/m <sup>3</sup> (Inhalable fraction)<br>5 mg/m <sup>3</sup> (respirable fraction)  |
| <b>Hungary • Occupational Exposure Limits</b>            |   |
| AK(OEL TWA)  | 1 mg/m <sup>3</sup> (respirable fraction)   |
| <b>Ireland • Occupational Exposure Limits</b>            |   |
| OEL TWA  | 1 mg/m <sup>3</sup> (respirable fraction)   |
| OELSTEL  | 3 mg/m <sup>3</sup> (calculated-respirable dust)  |

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|   |   |
|---|---|
| <b>Aluminum (7429-90-5)</b>                   |   |
| Latvia • Occupational Exposure Limits         |   |
| OEL TWA                                       | 2 mg/m <sup>3</sup>   |
| Uthuanla - Occupational Exposure Limits       |   |
| IPRV (OEL TWA)                                | 5 mg/m <sup>3</sup> (inhalable fraction)<br>2 mg/m <sup>3</sup> (respirable fraction)<br>1 mg/m <sup>3</sup>            |
| Poland • Occupational Exposure Limits         |   |
| NOS (OEL TWA)                                 | 2.5 mg/m <sup>3</sup> (non-stabilized-inhalable fraction)<br>1.2 mg/m <sup>3</sup> (non-stabilized-respirable fraction) |
| Portugal - Occupational Exposure Limits       |   |
| OEL TWA                                       | 1 mg/m <sup>3</sup> (metal-filspirable fraction)  |
| OEL chemical category                         | M - Not Classifiable as a Human Carcinogen  |
| Romania • Occupational Exposure Limits        |   |
| OEL TWA                                       | 3 mg/m <sup>3</sup> (dust)<br>1 mg/m <sup>3</sup> (fume)  |
| OELSTEL                                       | 10 mg/m <sup>3</sup> (dust)<br>3 mg/m <sup>3</sup> (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 <sup>3</sup> (inhalable dust)<br>1.5 mg/m <sup>3</sup> (respirable dust)   |
| Slovakia - Biological limit values            |   |
| BLV   | 60 µg/g creatinine Parameter. Al.lminum - Medium: urine - Sampling time: not critical                                   |
| Spain - Occupational Exposure U mils          |   |
| VLA-ED (OEL TWA)                              | 1 mg/m <sup>3</sup> (see UNE EN 481:1995 on workplace atmospheres-respirable fraction)                                  |
| Sweden - Occupational Exposure Limits         |   |
| NGV (OEL IWA)                                 | 5 mg/m <sup>3</sup> (total dust)<br>2 mg/m <sup>3</sup> (respirable fraction)   |
| United Kingdom • Occupational Exposure Limits |   |
| WEL TWA (OEL TWA)                             | 10 mg/m <sup>3</sup> (inhalable dust)<br>4 mg/m <sup>3</sup> (respirable dust)  |
| WEL STEL (OEL STEL)                           | 30 mg/m <sup>3</sup> (calculated-inhalable dust)<br>12 mg/m <sup>3</sup> (calculated respirable dust)                   |
| Norway • Occupational Exposure Limits         |   |
| Grøntidsverdi (OEL TWA)                       | 5 mg/m <sup>3</sup> (pyrotechnical-powder)  |
| Korttidsverdi (OEL STEL)                      | 10 mg/m <sup>3</sup> (pyrotechnical-powder)   |

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|   |   |
|---|---|
| Aluminum (7429-90-5)                          |   |
| Switzerland • Occupational Exposure Limits    |   |
| MAK (OEL TWA)                                 | 3 mg/m <sup>3</sup> (respirable dust)<br>3 mg/m <sup>3</sup> (total dust limit values-respirable fraction)<br>10 mg/m <sup>3</sup> (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)<br>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 <sup>3</sup> (respirable particulate matter)   |
| ACGIH chemical category                       | Not Classifiable as a Human Carcinogen  |
| Ethane, homopolymer (9002418-4)               |   |
| Bulgaria - Occupational Exposure Limits       |   |
| OEL TWA                                       | 10 mg/m <sup>3</sup> (dust (Dust from Polyethylene))  |
| Czech Republic - Occupational Exposure Limits |   |
| PEL (OEL TWA)                                 | 5 mg/m <sup>3</sup> (dust)  |
| Latvia - Occupational Exposure Limits         |   |
| OEL TWA                                       | 5 mg/m <sup>3</sup> (dust (Polymers dust))  |
| Uthuanla - Occupational Exposure Limits       |   |
| IPRV (OEL TWA)                                | 10 mg/m <sup>3</sup>  |
| Iron oxide (Fe2O3) (1309-37-1)                |   |
| Austria • Occupational Exposure Limits        |   |
| MAK (OEL TWA)                                 | 5 mg/m <sup>3</sup> (respirable fraction)   |
| MAK (OEL STEL)                                | 10 mg/m <sup>3</sup> (respirable fraction)  |
| Belgium • Occupational Exposure Limits        |   |
| OEL TWA                                       | 5 mg/m <sup>3</sup> (alveolar fraction)   |
| Bulgaria - Occupational Exposure Limits       |   |
| OEL TWA                                       | 5 mg/m <sup>3</sup>   |
| Croatia • Occupational Exposure Limits        |   |
| GVI (OEL TWA)                                 | 4 mg/m <sup>3</sup> (respirable dust)<br>5 mg/m <sup>3</sup> (fume)<br>10 mg/m <sup>3</sup> (total dust, inhalable particles)   |
| KGVI (OEL STEL)                               | 10 mg/m <sup>3</sup> (fume)   |
| Denmark • Occupational Exposure Limits        |   |
| OEL TWA                                       | 3,5 mg/m <sup>3</sup>   |
| OEL STEL                                      | 7 mg/m <sup>3</sup>   |

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|  |  |
|--|--|
| Iron oxide (Fe <sub>2</sub> O <sub>3</sub> ) (1309-37-1) |  |
| Estonia • Occupational Exposure Limits                   |  |
| OEL TWA  | 3.5mg/m <sup>3</sup>   |
| Finland • Occupational Exposure Limits                   |  |
| HTP (OEL TWA)  | 5 mg/m <sup>3</sup> (fume)   |
| France • Occupational Exposure Limits                    |  |
| VME (OEL TWA)  | 5 mg/m <sup>3</sup> (fume)<br>10 mg/m <sup>3</sup> (as synthetic red)  |
| Greece • Occupational Exposure Limits                    |  |
| OEL TWA  | 10 mg/m <sup>3</sup>   |
| OELSTEL  | 10 mg/m <sup>3</sup>   |
| Hungary • Occupational Exposure Limits                   |  |
| AK(OEL TWA)  | 4 mg/m <sup>3</sup> (respirable fraction)  |
| Ireland • Occupational Exposure Limits                   |  |
| OEL TWA  | 5 mg/m <sup>3</sup> (fume)<br>10 mg/m <sup>3</sup> (total inhalable dust)<br>4 mg/m <sup>3</sup> (respirable dust) |
| OELSTEL  | 10 mg/m <sup>3</sup> (fume)<br>12 mg/m <sup>3</sup> (calculated)<br>30 mg/m <sup>3</sup> (calculated)              |
| Lithuania • Occupational Exposure Limits                 |  |
| IPRV (OEL TWA)   | 3.5 mg/m <sup>3</sup> (inhalable fraction)   |
| Poland • Occupational Exposure Limits                    |  |
| NDS (OEL TWA)  | 2.5 mg/m <sup>3</sup> (respirable fraction)<br>5 mg/m <sup>3</sup> (inhalable fraction)                            |
| NDSch (OEL STEL)   | 10 mg/m <sup>3</sup> (inhalable fraction (Iron oxides))<br>5 mg/m <sup>3</sup> (respirable fraction (Iron oxides)) |
| Portugal • Occupational Exposure Limits                  |  |
| OEL TWA  | 5 mg/m <sup>3</sup> (respirable fraction)  |
| OEL chemical category                                    | A4 - Not Classifiable as a Human Carcinogen  |
| Romania • Occupational Exposure Limits                   |  |
| OEL TWA  | 5 mg/m <sup>3</sup> (dust and fume)  |
| OELSTEL  | 10 mg/m <sup>3</sup> (dust and fume)   |
| Slovakia • Occupational Exposure Limits                  |  |
| NPHV (OEL TWA)   | 1.5 mg/m <sup>3</sup> (respirable fraction)  |
| Spain • Occupational Exposure Limits                     |  |
| VLA-ED (OEL TWA)   | 5 mg/m <sup>3</sup> (dust and fume)  |

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|   |  |
|---|--|
| Iron oxide (Fe2O3) (1309,-37-1)               |  |
| Sweden • Occupational Exposure Limits         |  |
| NGV (OEL TWA)                                 | 3.5 mg/m" (resprable fraction)   |
| United Kingdom - Occupational Exposure Limits |  |
| WEL TWA (OEL TWA)                             | 5 mg/m• (fume)<br>10 mg/m" (total inhalable)<br>4 mg/m" (respirable)                         |
| WEL STEL (OEL STEL)                           | 10 mg/m• (fume)<br>30 mg/m" (calculated-total fnhalable)<br>12 mg/m" (calculated-respirable) |
| Norway - Occupational Exposure Limits         |  |
| Grønseverdi (OEL TWA)                         | 3 mg/m•  |
| Korttidsverdi (OEL STEL)                      | 6 mg/m• (value calculated)   |
| Switzerland • Occupational Exposure Limits    |  |
| MAK (OEL TWA)                                 | 3 mg/m" (respirable dust)  |
| USA-ACGIH -Occupational Exposure Limits       |  |
| ACGIH OEL TWA                                 | 5 mg/m• (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•  |
| Crvatia - Occupational Exposure Limits        |  |
| GVI (OEL TWA)                                 | 3.5 mg/m•  |
| KGVI (OEL STEL)                               | 7 mg/m•  |
| Czech Republic • Occupational Exposure Limits |  |
| PEL (OEL TWA)                                 | 2 mg/m• (dust)   |
| Denmark• Occupational Exposure Limits         |  |
| OEL TWA                                       | 3.5 mg/m•  |
| OELSTEL                                       | 7 mg/m•  |
| Estonia - Occupational Exposure Limits        |  |
| OEL TWA                                       | 3 mg/m•  |
| Finland • Occupational Exposure Limits        |  |
| HTP (OEL TWA)                                 | 3.5 mg/m•  |
| HTP (OEL \$TEL)                               | 7 mg/m•  |
| France - Occupational Exposure Limits         |  |
| VME (OEL TWA)                                 | 3.5 mg/m•  |



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| <b>Carbon black {1333-86-4}</b>                    |  |
| Greece - Occupational Exposure Limits              |  |
| OEL TWA  | 3.5 mg/m <sup>3</sup>  |
| OELSTEL  | 7 mg/m <sup>3</sup>  |
| Hungary - Occupational Exposure Limits             |  |
| AK(OEL TWA)  | 3 mg/m <sup>3</sup> (inhalable concentration (flying and fibrous powders))   |
| Ireland • Occupational Exposure Limits             |  |
| OELTWA   | 3 mg/m <sup>3</sup> (inhalable fraction)   |
| OELSTEL  | 15 mg/m <sup>3</sup> (calculated-inhalable fraction)   |
| Poland • Occupational Exposure Limits              |  |
| NOS (OEL TWA)                                      | 4 mg/m <sup>3</sup> (inhalable fraction)   |
| Portugal - Occupational Exposure Limits            |  |
| OEL TWA  | 3 mg/m <sup>3</sup> (inhalable fraction)   |
| OEL chemical category                              | A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans  |
| Slovakia - Occupational Exposure Limits            |  |
| NPHV (OEL TWA)                                     | 2 mg/m <sup>3</sup> (respirable fraction, 5% or less fibrogenic component)<br>10 mg/m <sup>3</sup> (respirable fraction, greater than 5% fibrogenic component)<br>10 mg/m <sup>3</sup> (total aerosol) |
| Spain - Occupational Exposure Limits               |  |
| VLA-ED (OEL TWA)                                   | 3.5 mg/m <sup>3</sup>  |
| SWeder1 - Occupational Exposure Limits             |  |
| NGV (OEL TWA)                                      | 3 mg/m <sup>3</sup> (Inhalable fraction)   |
| United Kingdom - Occupational Exposure Limits      |  |
| WEL TWA (OEL TWA)                                  | 3.5 mg/m <sup>3</sup>  |
| WEL STEL (OEL STEL)                                | 7 mg/m <sup>3</sup>  |
| Norway • Occupational Exposure Limits              |  |
| Grøntidsverd (OEL TWA)                             | 3.5 mg/m <sup>3</sup>  |
| Korttidsverd (OEL STEL)                            | 7 mg/m <sup>3</sup> (value calculated)   |
| USA - ACGIH • Occupational Exposure Limits         |  |
| ACGIH OEL TWA                                      | 3 mg/m <sup>3</sup> (inhalable particulate matter)   |
| ACGIH chemical category                            | Confirmed Animal Carcinogen with Unknown Relevance to Humans   |
| <b>Nickel (7440-02-G)</b>                          |  |
| EU - Indicative Occupational Exposure Limit (IOEL) |  |
| Local name   | Nickel metal   |
| IOEL TWA   | 0.005 mg/m <sup>3</sup> (respirable fraction)  |
| Remark   | (Year of adoption 2011)  |

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|---|--|
| 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 <sup>3</sup> (dust, inhalable fraction)   |
| OEL chemical category                         | Group A1 Carcinogen dust, Respiratory sensitizer dust, Skin sensitizer   |
| Belgium - Occupational Exposure Limits        |  |
| OEL TWA                                       | 1 mg/m <sup>3</sup>  |
| Bulgaria - Occupational Exposure Limits       |  |
| OEL TWA                                       | 0.05 mg/m <sup>3</sup>   |
| Bulgaria - Biological limit values            |  |
| BLV   | 45 µg/l Parameter: Nickel - Medium: urine - Sampling time: after several work shifts   |
| Croatia - Occupational Exposure Limits        |  |
| GM (OEL TWA)                                  | 0.5mg/m <sup>3</sup>   |
| Croatia - Biological limit values             |  |
| BLV   | 10 µg/l Parameter: Nickel - Medium: plasma • Sampling time: at the end of the work shift<br>8 µg/g creatinine Parameter: Nickel - Medium: urine - Sampling time: at the end of the work shift (calculated on the average Creatinine value of 12 g/L urine) |
| Czech Republic - Occupational Exposure Limits |  |
| PEL (OEL TWA)                                 | 0.5 mg/m <sup>3</sup> (respirable fraction of aerosol)   |
| OEL chemical category                         | Sensitizer   |
| Czech Republic - Biological limit values      |  |
| BLV   | 0.01 1,1mM/mrd Creatinine Parameter: Nickel - Medium: urine - Sampling time: discretionary<br>0.04 mg/g creatinine Parameter: Nickel - Medium: urine - Sampling time: discretionary  |
| Denmark - Occupational Exposure Limits        |  |
| OEL TWA                                       | 0.05 mg/m <sup>3</sup> (dust and powder)   |
| OELSTEL                                       | 0.1 mg/m <sup>3</sup> (dust and powder)  |
| Estonia - Occupational Exposure Limits        |  |
| OEL TWA                                       | 0.5 mg/m <sup>3</sup>  |
| OEL chemical category                         | Sensitizer   |
| Finland - Occupational Exposure Limits        |  |
| HIP (OEL TWA)                                 | 0.01 mg/m <sup>3</sup> (respirable dust)   |

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|---|--|
| <b>Nickel (7440-02-0)</b>                         |  |
| Finland - Biological limit values                 |  |
| BLV   | 0.1 µmoVI 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 <sup>3</sup><br>1 mgJm <sup>3</sup> (metal gratings)  |
| OEL chemical category                             | Carcinogen category 2  |
| Germany - Occupational Exposure Limits (TRGS 900) |  |
| AGW (OEL TWA)                                     | 0.03 mg/m <sup>3</sup> (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed-respirable fraction)<br>0.006 mg/m <sup>3</sup> (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 <sup>3</sup>  |
| Hungary - Occupational Exposure Limits            |  |
| AK(OEL TWA)                                       | 0.01 mg/m <sup>3</sup>   |
| OEL chemical category                             | Sensitizer, Care. 1B - Presumed Carcinogen   |
| Ireland - Occupational Exposure Limits            |  |
| OEL TWA   | 0.5 mg/m <sup>3</sup>  |
| OELSTEL   | 1.5 mg/w (calculated)  |
| OEL chemical category                             | Sensitizer   |
| Latvia - Occupational Exposure Limits             |  |
| OEL TWA   | 0.05 mg/m <sup>3</sup>   |
| Latvia - Biological Exposure Indices              |  |
| BEI   | 3 µg/l Parameter; Nickel - Medium: urine   |
| Lithuania - Occupational Exposure Limits          |  |
| IPRV (OEL TWA)                                    | 0.5 mg/m <sup>3</sup>  |
| OEL chemical category                             | Sensitizer, Carcinogen   |
| Poland - Occupational Exposure Limits             |  |
| NDS (OEL TWA)                                     | 0.25 mg/m <sup>3</sup>   |
| Portugal - Occupational Exposure Limits           |  |
| OEL TWA   | 1.5 mg/m <sup>3</sup> (Inhalable fraction)   |
| OEL chemical category                             | A5 - Not Suspected as a Human Carcinogen   |
| Romania - Occupational Exposure Limits            |  |
| OELTWA  | 0.1 mg/m <sup>3</sup>  |

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



|  |   |
|--|---|
| <b>Nickel (7440-02-0)</b>                          |   |
| ACGIH chemical cate!JOIY                           | Not Suspected as a Human Carcinogen   |
| USA -ACGIH - Biological Exposure Indices           |   |
| BEI  | 5 1,1gl Parameter. Nickel - Medium: urine - Sampling lime: post-shift at end of workweek (background)                                     |
| <b>1-Methyl-2-pyrrolidone {872-50-4}</b>           |   |
| EU • Indicative Occupational Exposure Limit (IOEL) |   |
| IOEL TWA   | 40 mg/m"  |
| EU - Binding Occupational Exposure Limit (BOEL)    |   |
| Local name   | 1-Methyl-2-pyrrolidone  |
| BOEL TWA   | 40 mg/m"  |
|  | 10ppm   |
| BOELSTEL   | 80 mg/m"  |
|  | 20ppm   |
| 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: uririe - Sampling time: morning-after-shift ; 18 hours              |
|  | 70 mg/g creatinine Parameter: 5-hydroxy-N-methyl-2-pyrrolldone - 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 mgJm•  |
|  | 3.6 ppm   |
| MAK (OEL STEL)                                     | 28.8 mgJm•  |
|  | 7.2 ppm   |
| OEL chemical category                              | Skin notation   |
| Belgium -Occupational Exposure Limits              |   |
| OEL TWA  | 40 mg/m"  |
|  | 10ppm   |
| OELSTEL  | 80 mg/m"  |
|  | 20ppm   |
| OEL chemical category                              | Skin, Skin notation   |



| 1-Methyl-2-pyrrolidone (872-50-4)             |   |
|---|---|
| Bulgaria - Occupational Exposure Limits       |   |
| OEL TWA                                       | 40 mg/m <sup>3</sup>  |
|   | 10ppm   |
| OEL STEL                                      | 80 mg/m <sup>3</sup>  |
|   | 20ppm   |
| Croatia - Occupational Exposure Limits        |   |
| GVI (OEL TWA)                                 | 40 mg/m <sup>3</sup>  |
|   | 10ppm   |
| KGI (OEL STEL)                                | 80 mg/m <sup>3</sup>  |
|   | 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)<br>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 <sup>3</sup>  |
|   | 10ppm   |
| OEL STEL                                      | 80 mg/m <sup>3</sup>  |
|   | 20ppm   |
| OEL chemical category                         | Skin-potential for cutaneous absorption   |
| Czech Republic - Occupational Exposure Limits |   |
| PEL (OEL TWA)                                 | 40 mg/m <sup>3</sup>  |
| OEL chemical category                         | Potential for cutaneous absorption  |
| Denmark - Occupational Exposure Limits        |   |
| OEL TWA                                       | 20 mg/m <sup>3</sup>  |
|   | 5ppm  |
| OEL STEL                                      | 80 mg/m <sup>3</sup>  |
|   | 20ppm   |
| OEL chemical category                         | Potential for cutaneous absorption  |
| Estonia - Occupational Exposure Limits        |   |
| OEL TWA                                       | 40 mg/m <sup>3</sup>  |
|   | 10ppm   |



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|   |   |
|---|---|
| <b>1-Methyl-2-pyrrolidone (872-50-4)</b>          |   |
| OEL STEL  | 80 mg/m <sup>3</sup>  |
|   | 20 ppm  |
| OEL chemical category                             | Skin notation   |
| Finland - Occupational Exposure Limits            |   |
| HTP (OEL TWA)                                     | 14 mg/m <sup>3</sup>  |
|   | 3.5 ppm   |
| HTP (OEL STEL)                                    | 80 mg/m <sup>3</sup>  |
|   | 20 ppm  |
| OEL chemical category                             | Potential for cutaneous absorption  |
| Finland - Biological limit values                 |   |
| BLV   | 8 µmol Creatinine Parameter: 5-Hydroxy-N-methyl-2-pyrrolidone - Medium: urine - Sampling time: in the morning after a working day<br>5 µmol Creatinine Parameter: 2-Hydroxy-N-methyl-succinimide - Medium: urine - Sampling time: after the shift |
| France - Occupational Exposure Limits             |   |
| VME (OEL IWA)                                     | 40 mg/m <sup>3</sup> (Indicative limit)   |
|   | 10 ppm (Indicative limit)   |
| VLE (OEL C/STEL)                                  | 80 mg/m <sup>3</sup> (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 <sup>3</sup> (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 <sup>3</sup>  |
|   | 10 ppm  |
| OEL STEL  | 80 mg/m <sup>3</sup>  |
|   | 20 ppm  |
| OEL chemical category                             | Skin notation   |
| Greece - Occupational Exposure Limits             |   |
| OEL TWA   | 40 mg/m <sup>3</sup>  |

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|   |   |
|---|---|
| 1-Methyl-2-pyrrolidone (872-60-4)         |   |
|   | 10ppm                                     |
| OEL STa                                   | 80 mg/m <sup>3</sup>                      |
|   | 20ppm                                     |
| OEL chemical category                     | skin - potential for cutaneous absorption |
| Hungary • Occupational Exposure Limits    |   |
| AK(OEL TWA)                               | 40 mg/m <sup>3</sup>                      |
| CK (OEL STEL)                             | 80 mg/m <sup>3</sup>                      |
| OEL chemical category                     | Potential for cutaneous absorption        |
| Ireland • Occupational Exposure Limits    |   |
| OEL TWA                                   | 40 mg/m <sup>3</sup>                      |
|   | 10ppm                                     |
| OEL STEL                                  | 80 mg/m <sup>3</sup>                      |
|   | 20ppm                                     |
| OEL chemical category                     | Potential for cutaneous absorption        |
| Italy • Occupational Exposure Limits      |   |
| OEL TWA                                   | 40 mg/m <sup>3</sup>                      |
|   | 10ppm                                     |
| OEL STEL                                  | 80 mg/m <sup>3</sup>                      |
|   | 20ppm                                     |
| OEL chemical category                     | skin - potential for cutaneous absorption |
| Latvia • Occupational Exposure Limits     |   |
| OEL TWA                                   | 40 mg/m <sup>3</sup>                      |
|   | 10ppm                                     |
| OEL chemical category                     | skin - potential for cutaneous exposure   |
| Lithuania • Occupational Exposure Limits  |   |
| IPRV (OEL TWA)                            | 40 mg/m <sup>3</sup>                      |
|   | 10ppm                                     |
| TPRV (OEL STEL)                           | 80 mg/m <sup>3</sup>                      |
|   | 20ppm                                     |
| OEL chemical category                     | Reproductive toxin, Skin notation         |
| Luxembourg • Occupational Exposure Limits |   |
| OEL TWA                                   | 40 mg/m <sup>3</sup>                      |
|   | 10ppm                                     |
| OEL STEL                                  | 80 mg/m <sup>3</sup>                      |



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| <b>1-Methyl-2-pyrrolldone (872-50-4)</b>          |  |
|   | 20ppm  |
| OEL chemical category                             | Possibility of significant uptake through the skin             |
| <b>Malta • Occupational Exposure Limits</b>       |  |
| OEL TWA   | 40 mg/rn'  |
|   | 10ppm  |
| OELSTEL   | 80 mg/rn'  |
|   | 20ppm  |
| OEL chemical category                             | Possibility of significant uptake through the skin             |
| <b>Netherlands • Occupational Exposure Limits</b> |  |
| TGG-8u (OEL TWA)                                  | 40mg/m•  |
|   | 10ppm  |
| TGG-15min (OEL STEL)                              | 80 mg/m"   |
|   | 20ppm  |
| MAC chemical category                             | Skin notation  |
| <b>Poland • Occupational Exposure Limits</b>      |  |
| NDS (OEL TWA)                                     | 40 mg/m"   |
| NDSCh (OEL STEL)                                  | 80mg/m•  |
| <b>Portugal • Occupational Exposure Limits</b>    |  |
| OEL TWA   | 40 mg/m• (indicative limit value)                              |
|   | 10 ppm (Indicative limit value)                                |
| OELSTEL   | 80 mg/rn' (indicative limit value)                             |
|   | 20 ppm (indicative limit value)                                |
| OEL chemical category                             | skin - potential for cutaneous exposure indicative limit value |
| <b>Romania • Occupational Exposure Limits</b>     |  |
| OEL TWA   | 40 mg/m•   |
|   | 10ppm  |
| OELSTEL   | 80 mg/m"   |
|   | 20ppm  |
| OEL chemical category                             | Skin notation  |
| <b>Slovakia • Occupational Exposure Limits</b>    |  |
| NPHV (OEL TWA)                                    | 40mg/m•  |
|   | 10ppm  |
| NPHV (OELC)                                       | 80 mg/m"   |
| OEL chemical category                             | Potential for cutaneous absorption                             |





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| 1-Methyl-2-pyrrolidone (872-50-4)             |  |
|---|--|
| Slovenia - Occupational Exposure Limits       |  |
| OELTWA  | 40 mg/m <sup>3</sup> (vapor)   |
|   | 10 ppm (vapor)   |
| OELSTEL                                       | 80 mg/m <sup>3</sup> (vapor)   |
|   | 20 ppm (vapor)   |
| OEL chemical category                         | Category 1B, Potential for cutaneous absorption  |
| Spain - Occupational Exposure Limits          |  |
| VLA-ED (OEL TWA)                              | 40 mg/m <sup>3</sup> (indicative limit value)  |
|   | 10 ppm (indicative limit value)  |
| VLA-EC (OEL STEL)                             | 80 mg/m <sup>3</sup>   |
|   | 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 <sup>3</sup>   |
|   | 3.6 ppm  |
| KGV (OEL STEL)                                | 80 mg/m <sup>3</sup>   |
|   | 20 ppm   |
| OEL chemical category                         | Skin notation  |
| United Kingdom - Occupational Exposure Limits |  |
| WEL TWA (OEL TWA)                             | 40 mg/m <sup>3</sup>   |
|   | 10 ppm   |
| WEL STEL (OEL STEL)                           | 80 mg/m <sup>3</sup>   |
|   | 20 ppm   |
| WEL chemical category                         | Potential for cutaneous absorption   |
| Norway - Occupational Exposure Limits         |  |
| Grenseverd (OEL TWA)                          | 20 mg/m <sup>3</sup>   |
|   | 5 ppm  |
| Korttidsverd (OEL STEL)                       | 80 mg/m <sup>3</sup> (value from the regulation)   |
|   | 20 ppm (value from the regulation)   |
| OEL chemical category                         | Skin notation, Potential reproductive hazard   |



|  |   |
|--|---|
| <b>1-Methyl-2-pyrrolidone (872-50-4)</b>           |   |
| Switzerland • Occupational Exposure Limits         |   |
| MAK (OEL IWA)                                      | 80 mg/m <sup>3</sup> (aerosol, vapour)<br>20 ppm (aerosol, vapour)  |
| KZGW (OEL STEL)                                    | 160 mg/m <sup>3</sup> (aerosol, vapour)<br>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  |
| <b>Chromium (7440-47-3)</b>                        |   |
| EU • Indicative Occupational Exposure Limit (IOEL) |   |
| Local name   | Chromium metal  |
| IOEL TWA   | 2 mg/m <sup>3</sup>   |
| Regulatory reference                               | COMMISSION DIRECTIVE 2006/15/EC   |
| Austria • Occupational Exposure Limits             |   |
| MAK (OEL TWA)                                      | 2 mg/m <sup>3</sup>   |
| Belgium - Occupational Exposure Limits             |   |
| OEL TWA  | 0.5 mg/m <sup>3</sup>   |
| Bulgaria. occupational Exposure Limits             |   |
| OEL TWA  | 2 mg/m <sup>3</sup>   |
| Croatia - Occupational Exposure Limits             |   |
| GVI(OEL TWA)                                       | 2 mg/m <sup>3</sup>   |
| 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 <sup>3</sup>   |
| Czech Republic - Occupational Exposure Limits      |   |
| PEL (OEL IWA)                                      | 0.5 mg/m <sup>3</sup> (dust)  |
| Denmark • Occupational Exposure Limits             |   |
| OEL TWA  | 0.5 mg/m <sup>3</sup> (powder)  |
| OEL STEL   | 1 mg/m <sup>3</sup> (powder)  |
| Estonia - Occupational Exposure Limits             |   |
| OEL TWA  | 2 mg/m <sup>3</sup>   |



| Chromium (7440 7-3)                               |   |
|---|---|
| Finland • Occupational Exposure Limits            |   |
| HTP (OEL TWA)                                     | 0.5 mg/m <sup>3</sup>   |
| France • Occupational Exposure Limits             |   |
| VME (OEL TWA)                                     | 2 mg/m <sup>3</sup> (Indicative limit)  |
| France • Biological limit values                  |   |
| BLV   | 2.5 µg 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 <sup>3</sup> (except the one listed by name-inhalable fraction)  |
| Gibraltar • Occupational Exposure Limits          |   |
| OEL TWA   | 2 mg/m <sup>3</sup>   |
| Greece • Occupational Exposure Limits             |   |
| OEL TWA   | 1 mg/m <sup>3</sup>   |
| Hungary • Occupational Exposure Limits            |   |
| AK(OEL TWA)                                       | 2 mg/m <sup>3</sup>   |
| OEL chemical category                             | Sensitizer  |
| Ireland • Occupational Exposure Limits            |   |
| OEL TWA   | 2 mg/m <sup>3</sup>   |
| OEL STEL  | 6 mg/m <sup>3</sup> (calculated)  |
| Italy • Occupational Exposure Limits              |   |
| OEL TWA   | 0.5 mg/m <sup>3</sup>   |
| Latvia • Occupational Exposure Limits             |   |
| OEL TWA   | 2 mg/m <sup>3</sup>   |
| Latvia • Biological Exposure Indices              |   |
| BEI   | 10 µg 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 <sup>3</sup>   |
| Luxembourg • Occupational Exposure Limits         |   |
| OEL TWA   | 2 mg/m <sup>3</sup>   |
| Malta • Occupational Exposure Limits              |   |
| OEL TWA   | 2 mg/m <sup>3</sup>   |
| Netherlands • Occupational Exposure Limits        |   |
| TGG.au (OEL TWA)                                  | 0.5 mg/m <sup>3</sup> (metallic)  |



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



|   |  |
|---|--|
| Ethylbenzene (100-41-4)                 |  |
| IOEL TWA                                | 442 mg/m <sup>3</sup>  |
|   | 100ppm   |
| IOELSTEL                                | 884 mg/m <sup>3</sup>  |
|   | 200ppm   |
| 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 <sup>3</sup>  |
|   | 100ppm   |
| MAK (OEL STEL)                          | 880 mg/m <sup>3</sup>  |
|   | 200ppm   |
| OEL chemical category                   | Skin notation  |
| Belgium • Occupational Exposure Limits  |  |
| OEL TWA                                 | 87mg/m <sup>3</sup>  |
|   | 20ppm  |
| OELSTEL                                 | 551 mg/m <sup>3</sup>  |
|   | 125ppm   |
| OEL chemical category                   | Skin, Skin notation  |
| Bulgaria • Occupational Exposure Limits |  |
| OEL TWA                                 | 435 mg/m <sup>3</sup>  |
| OELSTEL                                 | 545 mg/m <sup>3</sup>  |
| 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 <sup>3</sup>  |
|   | 100ppm   |
| KGVI (OEL STEL)                         | 884 mg/m <sup>3</sup>  |
|   | 200 ppm  |
| OEL chemical category                   | Skin notation  |
| Croatia • Biological limit values       |  |
| BLV                                     | 1.5 mg/l Parameter: Ethylbenzene - Medium: blood - Sampling time: during exposure<br>1.5 mg 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) |

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| <b>Ethylbenzene (100-41-4)</b>                       |   |
|--|---|
| <b>Cyprus • Occupational Exposure Limits</b>         |   |
| OEL TWA  | 442 mg/m'<br>100ppm   |
| OELSTEL  | 884 mg/m'<br>200 ppm  |
| OEL chemical category                                | Skin-potential for cutaneous absorption   |
| <b>Czech Republic • Occupational Exposure Limits</b> |   |
| PEL (OEL "TWA)                                       | 200 mg/m'   |
| OEL chemical category                                | Potential for cutaneous absorption  |
| <b>Czech Republic • Biological limit values</b>      |   |
| BLV  | 1100 11mol/mmol Creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: end of shift<br>1500 mg/g c at1nine Parameter: Mandelic acid - Medfum: urine - Sampling time: end of shift |
| <b>Denmark • Occupational Exposure Limits</b>        |   |
| OEL TWA  | 217 mg/m•<br>50ppm  |
| OELSTEL  | 434 mg/m"<br>10D ppm  |
| OEL chemical category                                | Potential for cutaneous absorption  |
| <b>Estonia • Occupational Exposure Limits</b>        |   |
| OEL TWA  | 442 mg/m'<br>100 ppm  |
| OELSTEL  | 884 mg/m"<br>200ppm   |
| OEL chemical category                                | Skin notation, Sensitizer   |
| <b>Finland • Oeeupational Exposure Limits</b>        |   |
| HTP (OEL TWA)  | 220 mgtm•<br>50 ppm   |
| HTP (OEL \$TEL)                                      | 880 mgtm•<br>200ppm   |
| OEL chemical category                                | Potential for cutaneous absorption  |
| <b>Finland • Biological Ilmit values</b>             |   |
| BLV  | Parameter: Mandellc acid • Medium: urine - Sampling time: after the shift after a working week or exposure period   |

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|   |  |
|---|--|
| Ethylbenzene (100-41-4)                           |  |
| France • Occupational Exposure limits             |  |
| VME (OEL IWA)                                     | 88.4 mg/m <sup>3</sup> (restrictive limit)<br>20 ppm (restrictive limit)   |
| VLE (OEL C/STEL)                                  | 442 mg/m <sup>3</sup> (restrictive limit)<br>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 <sup>3</sup> (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)<br>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   | 442mg/m <sup>3</sup><br>100ppm   |
| OELSTEL   | 884 mg/m <sup>3</sup><br>200ppm  |
| OEL chemical category                             | Skin notation  |
| Greece - Occupational Exposure Limits             |  |
| OEL TWA   | 435 mg/m <sup>3</sup><br>100ppm  |
| OELSTEL   | 545 mg/m <sup>3</sup><br>125ppm  |
| Hungary - Occupational Exposure Limits            |  |
| AK(OEL TWA)                                       | 442mg/m <sup>3</sup>   |
| OK (OEL STEL)                                     | 884 mg/m <sup>3</sup>  |
| OEL chemical category                             | Potential for cutaneous absorption   |
| Ireland - Occupational Exposure Limits            |  |
| OEL TWA   | 442 mg/m <sup>3</sup>  |

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





| Ethylbenzene (100-41-4)                 |  |
|---|--|
|   | 48.6 ppm   |
| TGG-15min (OEL STEL)                    | 430 mg/m <sup>3</sup>  |
|   | 97.3 ppm   |
| MAC chemical category                   | Skin notation  |
| Poland • Occupational Exposure Limits   |  |
| NDS (OEL rNA)                           | 200mg/m <sup>3</sup>   |
| NDSch (OEL STEL)                        | 400 mg/m <sup>3</sup>  |
| Portugal • Occupational Exposure Limits |  |
| OEL TWA                                 | 442 mg/m <sup>3</sup> (indicative limit value)   |
|   | 100 ppm (indicative limit value)   |
| OELSTEL                                 | 884 mg/m <sup>3</sup> (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 <sup>3</sup>  |
|   | 100ppm   |
| OELSTEL                                 | 884 mg/m <sup>3</sup>  |
|   | 200ppm   |
| OEL chemical category                   | Skin notation  |
| Romania • Biological limit values       |  |
| BLV                                     | 1.5 g/g creatinine Parameter: Mandelic acid- Medium: urine -Sampling time: end ofworkweek  |
| Slovakia • Occupational Exposure Limits |  |
| NPHV (OEL TWA)                          | 442mg/m <sup>3</sup>   |
|   | 100ppm   |
| NPHV(OELC)                              | 884 mg/m <sup>3</sup>  |
| 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)<br>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 <sup>3</sup>  |
|   | 100 ppm  |



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



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|  |  |
|--|--|
| 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                              | 20ppm  |
| ACGIH chemical category                    | Confirmed Animal Carcinogen with Unknown Relevance to Humans   |
| USA -ACGIH • Biological Exposure Indices   |  |
| BEI  | 0.15 gig 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

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### 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          |
| Color   | : 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 <sup>3</sup> (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/V4h  |
| Propanoic acid, methyl ester (554-12-1)          |  |
| LD50 oral rat                                    | 5 g/kg (Source: NLM_CIP)   |
| LC50 Inhalation - Rat                            | > 22.7 mg/V4h  |
| 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 8-4)                   |  |
| LD50 oral rat                                    | > 8 g/kg (Source: NLM_HSDB)  |



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|  |  |
|--|--|
| <b>Iron oxide (Fe2O3) (1309-37-1)</b>    |  |
| LDS0 oral rat                            | > 10000 mg/kg (Source: IUCLID)   |
| <b>Boehmite {1318-23-6}</b>              |  |
| LDS0 oral rat                            | > 5050 mg/kg (Source: IUCLID)  |
| LC50 Inhalation - Rat                    | > 5.09 mg/V4h  |
| LC50 Inhalation - Rat (Dust/Mist)        | >2.3 mg/V4h  |
| <b>Carbon black (1333-86-4)</b>          |  |
| LD50 oral rat                            | > 15400 mg/kg (Source: NLM_CIP)  |
| LD50 dermal rabbit                       | > 8000 mg/kg Source: ECHA  |
| LC50 Inhalation - Rat                    | > 4.6 mg/m <sup>3</sup> (Exposure time: 4 h Source: ECHA_API)                              |
| <b>Nickel (7440-02-0)</b>                |  |
| LD50 oral rat                            | > 9000 mg/kg (Source: EU_RAR)  |
| LC50 Inhalation - Rat                    | > 10.2 mg/l (Exposure time: 1 h Source: EU_RAR)  |
| <b>1-Methyl-2-pyrrolidone {872-60-4}</b> |  |
| 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  |
| <b>Chromium (7440-47-3)</b>              |  |
| LOS0 oral rat                            | > 5000 mg/kg bodyweight  |
| LC50 Inhalation - Rat                    | > 5.41 mg/V4h  |
| <b>Lithium carbonate (554-13-2)</b>      |  |
| LOS0 oral rat                            | 525 mg/kg (Source: NLM_CIP)  |
| LOS0 dermal rabbit                       | > 3000 mg/kg (Source: ECHA_API)  |
| LCS0 Inhalation - Rat                    | > 2.17 mg/V4h  |
| <b>Ethylbenzene (100-41-4)</b>           |  |
| LD50 oral rat                            | 3500 mg/kg (Source: JAPAN_GHS)   |
| LDS0 dermal rabbit                       | 15400 mg/kg (Source: JAPAN_GHS)  |
| LCS0 Inhalation - Rat                    | 17.4 mg/l/4h   |
| LCS0 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   |

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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] J                                 | > 100 mg/l Test organisms (species): Danio rerio (previous name: Brachydanlo rerio)   |
| ECS0 - 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 capricomutum)    |
| ECS0 72h - Algae [2]                              | 7.2 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricomutum)   |
| NOEC (chronic)                                    | 47 mg/l Test organisms (species): Daphnia magna Duration: '21 d'  |
| Copper (7440-50-8)                                |   |
| LC50 • Fish [1] J                                 | 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)  |
| ECS0 - Crustacea [1]                              | 0.03 mgn (Exposure time: 48 h - Species: Daphnia magna [Static])  |
| EC50 72h-Algae (1)                                | 0.0428 - 0.0535 mg/l (Species: Pseudokirchneriella subcapitata [static])  |
| ECS0 98h-Algae [1]                                | 0.031 - 0.054 mgn (Species: Pseudokirchneriella subcapitata [static])   |
| Phosphate(1-), hexafluoro-, lithium (21324-40--3) |   |
| EC50 98h • Algae [1]                              | > 100 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricomutum) |



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|  |  |
|--|--|
| 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)                   |  |
| LCS0 - Fish [1]                                  | 100000 mg/l (Exposure time: 96 h - Species: Danio rerio [static] Source: ECHA)   |
| Boehmite (1318-23-6)                             |  |
| LCS0 • Fish [1]                                  | > 100 mg/l (Exposure time: 96 h - Species: Pimephales promelas [semi-static] Source: IUCLID)   |
| LCS0 • Fish [2]                                  | > 100 mg/l (Exposure time: 96 h - Species: Oncolhynchus mykiss [semi-static] Source: IUCLID)   |
| ECS0 - Crustacea [1]                             | > 100 mg/l (Exposure time: 48 h - Species: Daphnia magna)  |
| ECS0 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  |
| ECS0 - Crustacea [1]                             | > 1000 mg/l Test organisms (species): Daphnia magna  |
| ECS0 72h-Algae [1]                               | > 10000 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)                                    |
| ECS0 72h - Algae [2]                             | > 10000 mg/l Test organisms (species):   |
| ErCS0Algae                                       | > 10000 mg/l Source: ECHA  |
| Nickel (7440-02-0)                               |  |
| LCS0 - Fish [1]                                  | > 100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio Source: IUCLID)   |
| LCS0 - Fish [2]                                  | 1.3 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static] Source: EPA)  |
| ECS0- Crustacea [1]                              | > 100 mg/l (Exposure time: 48 h - Species: Daphnia magna)  |
| ECS0 - Crustacea [2]                             | 1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])   |
| ECS0 72h - Algae [1]                             | 0.18 mg/l (Species: Pseudokirchneriella subcapitata)   |
| ECS0 96h-Algae [1]                               | 0.174 - 0.311 mg/l (Species: Pseudokirchneriella subcapitata [static])   |
| 1-Methyl-2-pyrrolidone (872-00-4)                |  |
| LCS0 • Fish [1]                                  | 832 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static] Source: IUCLID)  |





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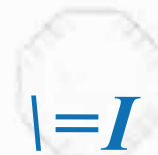
|                                   |   |
|-----------------------------------|---|
| 1-Methyl-2-pyrrolidone (872-50-4) |   |
| LC50 - Fish [2]                   | 1072 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: IUCLID)                |
| EC50 - Crustacea [1]              | 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): Oaphnia magna Duration: '21 d'                                      |
| NOEC (chronic)                    | 12.5 mg/l Test organisms (species): Daphnia magna Duration: '21 er                                    |
| Lithium carbonate (55,4.,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)               |
| ECS0 - Crustacea (1)              | 1. 8 - 2.4 mg/l (Exposure time: 48 h - Species: Daphnia magna)  |
| ECS0 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 (Co021-), lithium (12190-79-3)        |                                       |
| Bioaccumulative potential                       | No information available.             |
| Propanoic acid, methyl ester(554-12-1)          |                                       |
| Partition coefficient n-octanol/water (Log Pow) | 1.0.s (at 26.6 °C)                    |
| 4-Fluoro-1,3-dioxolan-2-one (114435-02-8)       |                                       |
| Partition coefficient n-octanol/water (Log Pow) | 1-0.435 (at 20.1 °C {at pH >3.6-<4.1) |
| Dimethyl carbonate (616-38-6)                   |                                       |
| Partition coefficient n-octanol/water (Log Pow) | 1 0.354 {at 20 °c (at pH >6.5-<7.5)   |



|   |                            |
|---|----------------------------|
| (1318-23-6)                                     |                            |
| BCF - Fish [1]                                  | 150-231                    |
| 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 (Li <sub>2</sub> NiO <sub>2</sub> ) (12325-84-7) |                            |
| Ecology - soil  | No information available.  |
| Cobaltate (CoO <sub>2</sub> ), 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 effect&

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 65<sup>th</sup>) / AON/ RID

| ADR  | IMDG   | IATA   | AON  | RID  |
|--|--|--|--|--|
| 14.1. UN number or ID number   |  |  |  |  |
| UN 3480  | UN 3480  | UN 3480  | UN 3480  | UN3480   |
| 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<br>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
- EACcode : 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) : S1

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Tel.: (86) 755 88286998  
 Fax: (86) 755 88285299



Stowage category (IMDG) : A  
 Stowage and handling (IMDG) : SW19  
 Properties and observations (IMDG) : Electrical batteries containing lithium ion encased in a rigid metallic body. Li!Num ion batteries may also be shipped in, or packed with, equipment. Electrical ilhium 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 quanHty (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 (AON) : 188,230,310,348,376,377,387,636  
 Limited quantities (AON) : 0  
 Excepted quantities (AON) : E0  
 Equipment required (AON) : PP  
 Number of blue cones/Dgghts (AON) : 0

**Rall 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 65") / AON / RID

| ADR  | IMDG   | IATA   | AON  | RID  |
|--|--|--|--|--|
| <b>14.1. UN number or ID number</b>          |  |  |  |  |
| UN 3481                                      | UN 3481                                      | UN 3481                                      | UN 3481                                      | UN 3481                                      |
| <b>14.2. UN proper shipping name</b>         |  |  |  |  |
| 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 |

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| 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<br>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) : S1  
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.

**Airtransport**

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 (AON) : 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 (TT82-42-5), Aluminium powder (7429-90-5), Nickel powder (7440-02-0)

**Explosives Precursor 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 (27312004)

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                    |
| SOS                         | Safety Data Sheet   |
| STP                         | Sewage treatment plant  |
| ThOD                        | Theoretical oxygen demand (ThOD)  |



| Abbreviations and acronyms: |  |
|-----------------------------|--|
| TLM                         | Median Tolerance Limit                   |
| VOE                         | 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 ---