

Nickel sulphate dihydrate**Date of issue: 04.06.2003****Revision No./Revision date: 13 / 01.01.2023**

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier:**Trade name:** nickel sulphate dihydrate**Synonyms:** nickel sulphate, nickel(II) sulphate(VI), nickel(II) sulfate, nickelous sulfate**UN-No.:** 3077**CAS No.:** 7786-81-4**WE No.:** 232-104-9**REACH registration No.:** 01-2119439361-44-0003**1.2 Relevant identified uses of the substance or mixture and uses advised against**Identified uses:

ES 1: Use at industrial sites; Intermediate use of nickel sulphate for the manufacture of nickel metal

ES 2: Use at industrial sites; Intermediate use of nickel sulphate for the manufacture of nickel salts

ES 3: Use at industrial sites; Intermediate use of nickel sulphate for the manufacture of nickel-containing inorganic pigments

ES 4: Formulation or re-packing; Use of nickel sulphate in formulating and repackaging of surface treatment products

ES 5: Use at industrial sites; Use of nickel sulphate in surface treatment (nickel electroplating, nickel electroforming and nickel electroless technologies)

ES 6: Use at industrial sites; Use of nickel sulphate for surface treatment of anodised aluminium sheets

ES 7: Use at industrial sites; Use of nickel sulphate in selective plating in industrial settings

ES 8: Service life (worker at industrial site); Service life of nickel-coated objects in industrial settings

ES 9: Service life (professional worker); Service life of nickel-coated objects in professional settings

ES 10: Use at industrial sites; Use of nickel sulphate in the production of abrasive tools

ES 11: Service life (worker at industrial site); Service life of abrasive tools containing nickel in industrial settings

ES 12: Service life (professional worker); Service life of abrasive tools containing nickel in professional settings

ES 13: Use at industrial sites; Intermediate use of nickel sulphate for the manufacture of nickel dihydroxide in the battery sector

ES 14: Use at industrial sites; Use of nickel sulphate for the production of plated electrodes in the battery sector

ES 15: Service life (worker at industrial site); Service life of nickel-containing batteries in industrial settings

ES 16: Service life (professional worker); Service life of nickel-containing batteries in professional settings

ES 17: Formulation or re-packing; Use of nickel sulphate in the formulation of micronutrient additives for biogas production

ES 18: Use at industrial sites; Use of nickel sulphate and nickel sulphate-derived micronutrients in biogas production

ES 19: Widespread use by professional workers; Use of nickel sulphate and nickel sulphate-derived micronutrients in compostable bags in biogas production

Uses advised against: product cannot be publically available.**1.3 Details of the supplier of the material safety data sheet:**

KGHM Polska Miedź S.A.

Oddział Huta Miedzi „Legnica”

ul. Złotoryjska 194

59-220 Legnica

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Person responsible for preparing the MSDS: phone No.: (+48 76) 76) 747 82 21, e-mail: karty.charakterystyki@kghm.com

1.4. Emergency telephone number:

Manufacturer (Poland): (+48 76) 747 50 02 – available 24/7

Fire Department (Poland): (+48) 998 – available 24/7

General European Emergency Number: 112 – available 24/7

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture:

Carc. 1A; H350 - may cause cancer;

Muta. 2; H341 - suspected of causing genetic defects.

Repr. 1 B; H360D - may damage the unborn child.

STOT RE 1; H372 - causes damage to organs through prolonged or repeated exposure.

Acute Tox. 4; H302 - harmful if swallowed;

Acute Tox. 4; H332 - harmful if inhaled;

Skin Irrit. 2; H315 - causes skin irritation;

Eye Irrit. 2; H319 - causes serious eye irritation;

Resp. Sens. 1; H334 - may cause allergy or asthma symptoms or breathing difficulties if inhaled;

Skin Sens. 1; H317 - may cause an allergic skin reaction;

Aquatic Acute 1; H400 - very toxic to aquatic life;

Aquatic Chronic 1; H410 - very toxic to aquatic life with long lasting effects.

2.2. Label elements:

"Restricted to professional users".

GHS 07



GHS 08



GHS 09



Signal Word: "DANGER"

Hazard statements (H):

H350 - May cause cancer

H341 - Suspected of causing genetic defects

H360D - May damage the unborn child

H372 - Causes damage to organs through prolonged or repeated exposure

H302 - Harmful if swallowed

H332 - Harmful if inhaled

H315 - Causes skin irritation

H319 - Causes serious eye irritation

H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled

H317 - May cause an allergic skin reaction

H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (P):

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P202 - Do not handle until all safety precautions have been read and understood.

P314 - Get medical advice/attention if you feel unwell.

P405 - Store locked up.

P501 - Dispose of contents/container to producer of product.

P273 - Avoid release to the environment.

2.3 Other hazards:

After heating up to higher temperatures, toxic products of decomposition are released, such as As_2O_3 , SO_2 , SO_3 . At temperature higher than $840^{\circ}C$, nickel(II) oxide is released. The substance reacts with most of metals and releases flammable hydrogen.

The substance does **not** meet classification criteria for PBT and vPvB.

The substance is **not** a substance 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.

SECTION 3. Composition/information on ingredients

3.1. Substances

No.	Compound	Content [mass fraction in %]	Hazard Class and Category Code(s)	H statements	Specific Conc. Limit, M-factor, ATE	REACH registration number
1.	$NiSO_4 \times 2 H_2O$ CAS No: 7786-81-4 WE No: 232-104-9 Index No: 028-009-00-5	> 85	Carc. 1A Muta. 2 Repr. 1B STOT RE 1 Acute tox. 4 Acute tox. 4 Skin. Irrit. 2 Resp. Sens. 1 Skin. Sens. 1 Aquatic Ac. 1 Aquatic Chr. 1	H350i H341 H360D H372 H302 H332 H315 H334 H317 H400 H410	STOT RE 1; H372: $C \geq 1\%$ STOT RE 2; H373: $0,1\% \leq C < 1\%$ Skin Irrit. 2; H315: $C \geq 20\%$ Skin Sens. 1; H317: $C \geq 0,01\%$ $M = 1$	01-2119439361 44-0003
2.	H_2SO_4 CAS No: 7664-93-9 WE No: 231-639-5 Index No: 016-020-00-8	≤ 10	Skin. Corr. 1A	H314	Skin Corr. 1A; H314: $C \geq 15\%$ Skin Irrit. 2; H315: $5\% \leq C < 15\%$ Eye Irrit. 2; H319: $5\% \leq C < 15\%$	01-2119458838 20-0041
3.	$CuSO_4$ CAS No: 7758-98-7 WE No: 231-847-6 Index No: 029-004-00-0	$\leq 9,8$	Acute Tox. 4 Eye Irrit. 2 Skin Irrit. 2 Aquatic Acute 1 Aquatic Chronic 1	H302 H319 H315 H400 H410	-	Impurity included in nickel(II) sulphate(VI) registration dossier
4.	$ZnSO_4$ CAS No: 7733-02-0 WE No: 231-793-3 Index No: 030-006-00-9	$\leq 1,2$	Acute Tox. 4 Eye Dam. 1 Aquatic Acute 1 Aquatic Chronic 1	H302 H318 H400 H410	-	Impurity included in nickel(II) sulphate(VI) registration dossier

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5.	H₃AsO₄ CAS No: 7778-39-4 WE No: 231-901-9 Index No: 033-005-00-1	≤ 0,5	Carc. 1A Acute Tox. 3 Acute Tox. 3 Aquatic Acute 1 Aquatic Chronic 1	H350 H301 H331 H400 H410	-	Impurity included in nickel(II) sulphate(VI) registration dossier
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Full text of H phrases not expanded in Section 2 can be found in Section 16.

3.2. Mixtures

n/a

SECTION 4. First Aid measures

4.1 Description of first aid measures:

Inhalation: Take the victim out of the place of exposure. Provide calmness in semi-sitting or sitting position. Protect against loss of body heat. **Immediate medical help necessary.**

Contact with eyes: Immediately rinse with a lot of cool, running water, for about 15 minutes, with eyelid open. Avoid intensive water jet because conjunctiva may become mechanically damaged. **Immediate medical help necessary.**

Skin contact: Remove contaminated clothing. Immediately clean contaminated skin with a lot of running water at room temperature. In case of skin changes, seek dermatologist attention.

Ingestion: Rinse mouth with water. Have the victim drink 2 glasses of water. If the vomiting is self-induced, rinse mouth with water and drink water again. **Immediate medical help necessary.**

General guidelines: Persons endangered to eye intoxication should be instructed about the necessity and method of immediate eye-rinsing.

Note: aqueous solutions have acid reaction, pH of 10% of aqueous solution is about 1.

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

Routes of exposure: ingestion, inhalation, skin, eyes.

- respiratory tract: vapour/dust is toxic, pose serious threat to health after long-term exposure, may cause cancer, cause burning of mucosa, dyspnoea, may cause sensitization;
- digestive tract: ingestion causes acute pain, nausea, vomiting, diarrhoea, burning of stomach cavity, throat, gullet;
- skin contact: causes burns, ulceration, may cause sensitization;
- contact with eyes: vapour/dust causes burning of eyelids and eyeballs.

Acute intoxication symptoms:

Product in the form of mist and fumes causes pain, weeping, burns of conjunctiva, cornea, throat pains, cough, shallow breathing, accelerated breathing, breathlessness, glottis spasm, larynx oedema, bronchi spasm, lungs oedema. Death may occur as a result of glottis spasm. Skin contamination causes thermal (exothermic reaction with moist skin) and chemical burning. Eyes contamination causes burning of eyelids, eyeball and permanent damage. When ingested, causes burns of oral cavity, throat, gullet; may lead to perforation of gullet, stomach, bleeding of alimentary tract, shock.

Long-term exposure:

Repeated contact of the substance with the skin causes allergic changes within it; with repeated contact with the respiratory tract, bronchial asthma and the risk of cancer of the mouth, throat and lungs may occur. Prolonged contact with sulfuric acid vapors may cause chronic conjunctivitis,

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nosebleeds and chronic bronchitis. Repeated skin exposure may cause ulceration, changes in nails, damage to tooth enamel.

4.3 Indication of any immediate medical attention and special treatment needed:

If the victim is unconscious, make sure that the respiratory tract is not obstructed and place the victim in a recovery position. **Provide medical assistance.**

SECTION 5. Firefighting measures

5.1 Extinguishing media:

Suitable extinguishing media: Non-flammable substance. Apply extinguishing media proper for the surrounding materials: water (if the container is tight) - sprayed jet, carbon dioxide, extinguishing powders, foam extinguishers, sand.

Unsuitable extinguishing media: Not known.

5.2 Special hazards arising from the substance or mixture:

Substance soluble in water, creating caustic solutions which when in contact with most of metals release extremely flammable hydrogen.

Hazardous decomposition products: at high temperatures, sulphuric acid is distilled off and decomposition takes place releasing toxic sulphur oxides vapours (SO₂, SO₃), dusts of nickel oxides and arsenic trioxide.

5.3 Advice for fire-fighters:

During fire harmful substances may form. Wear protective, gas-tight clothes and apparatus isolating respiratory ways.

Additional information: Notify those in the surroundings about the fire. Remove all personnel not participating in the breakdown liquidation procedure from the area of hazard. Call fire department or police department. If possible, remove containers from fire hazard area. Do not let the fire water, contaminated with the substance, to penetrate surface or underground water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

6.1.1 For non-emergency personnel: Do not inhale dusts. Avoid direct contact. In case of choosing evacuation route consider the direction of the dust/fume movement.

6.1.2 For emergency responders: Avoid dust generation, do not inhale dusts. Avoid direct contact. Apply clothing protecting against chemicals as well as eye protection. In case of dust formation, wear dust mask.

Additional information:

Notify those in the surroundings about the emergency. Remove all personnel not participating in the breakdown liquidation procedure from the area of hazard. Call fire department and police if necessary. Protect the spilt substance against rain and wind by covering it with canvas cover.

6.2 Environmental precautions:

Do not let the product penetrate the sewage system, ground and surface waters and soil. In case of accident, protect the substance against release to the environment. Collect maximum quantity to proper containers in order to utilize it.

6.3 Methods and material for containment and cleaning up:

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Liquidate the leak (seal the defective package and put it in the protective package). Collect the spilt substance to container (acid-resistant) and dispose of as hazardous waste. Procedure with waste according to section 13.

6.4 Reference to other sections:

Personal protection equipment is described in section 8, disposal considerations in section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling:

Avoid generation of vapour/dust within at the workplace. When handling the substance, do not drink, eat, smoke; avoid contact with the substance and its solutions. During work, apply eye and skin protection. Workplace should be equipped with eyewash and means for collecting spilt substance. After work, thoroughly clean hands and face.

7.2 Conditions for safe storage, including any incompatibilities:

Store in properly identified and tight acid resistant containers. Protect the container against damage. Keep the substance in roofed place with impermeable floor; if there is no roof, the substance must be protected against atmospheric precipitation with foil. Properly identify the storage place with access for authorized, trained personnel only.

Ventilation requirements: Premises must be equipped with proper local exhaust ventilation with housing in the area of vapours/dust emission to aerial environment and with general ventilation of the room. In case of insufficient ventilation, wear suitable individual protection of the respiratory system.

Other information: Always keep in original containers. Do not use emptied container for other purposes.

7.3 Specific end use(s):

Identified uses are listed in section 1.2.

SECTION 8. Exposure control/personal protection

8.1 Control parameters:

The following current national occupational exposure limit values apply (Poland):

No.	Substance name	CAS No.	TLV-TWA [mg/m ³]	TLV-STEL [mg/m ³]
1.	Nickel and its compounds, except nickel tetracarbonyl – calculated to Ni	-	0.25	-
2.	Sulphuric acid (VI) - thoracic fraction ⁽¹⁾	7664-93-9	0.05	-
3.	Arsenic and its inorganic compounds calculated to As – inhalable fraction ⁽²⁾	-	0.01	-

(1) Thoracic fraction - an aerosol fraction penetrating into the respiratory tract in the chest, which poses a risk to the health after deposit in the trachea and bronchial gas exchange area.

(2) Inhalable fraction - an aerosol fraction penetrating through the nose and mouth, which after being deposited in the respiratory tract poses a health hazard, determined in accordance with EN 481.

The following current national occupational exposure limit values apply (recipients):

No.	Substance name	CAS No.	TLV-TWA [mg/m ³]	TLV-STEL [mg/m ³]
1.	Soluble nickel compounds, except nickel tetracarbonyl – calculated to Ni	-	0.1 (ACGIH-TWA, USA) 1 (OSHA PEL, USA)	- -

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	Nickel compounds calculated to Ni		0.1 (MEL, Great Britain) 0.1 (TWA, Belgium) 0.1 (HTP, Finland)	- - -
	Soluble nickel salts calculated to Ni		0.05 (MAK-Wert, Germany)	-
2.	Sulphuric acid	7664-93-9	0.2 (ACGIH-TWA, USA) 1 (OSHA-PEL, USA) 0.2 (HTP, Finland) 0.1(MAK-Wert, Germany)	3 (ACGIH-TWA, USA) - 1 (HTP, Finland) 0.1 (MAK-Wert Germany)
	Sulphuric acid (vapours) ⁽¹⁾⁽²⁾		0.05 (European Union)	-
3.	Arsenic and its inorganic compounds calculated to As	-	0.01 (ACGIH-TWA, USA) 0.01 (HTP, Finland)	- -
	Arsenic and its compounds, except for arsenic hydride calculated to As		0.1 (TWA, Great Britain)	-

⁽¹⁾ When selecting appropriate method of monitoring the exposure, consider potential limitations and disturbances which could be created in the presence of other sulphur compounds.

⁽²⁾ Vapours are defined as trachea fraction.

MAK- und BAT-Werte-Liste 2021, Ständige Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe; Mitteilung 57.

Legal basis:

Decree of the Minister of Family, Labour and Social Policy of June 12th, 2018 on the highest allowable concentrations and intensities of agents harmful for health at the workplace (Official Journal of 2018 item 1286);

Regulation of the Minister of Family, Labour and Social Policy of January 9th, 2020 amending the Regulation on the highest allowable concentrations and intensities of agents harmful for health at the workplace (Official Journal of 2020 item 61).

Directive of the Commission 91/322/EEG of May 29th, 1991, on establishing indicative limit values by implementing Council Directive 80/1107/EEC on the protection of workers from the risks related to exposure to chemical, physical and biological agents at workplace (Official Journal L 177 of 5.7.1991);

Directive 2000/39/EC - indicative occupational exposure limit values of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at workplace (Official Journal L 142 of 16.6.2000 with subsequent amendments);

Directive of the Commission 2009/161/EU of December 17th, 2009, establishing the third list of indicative values of occupational exposure in order to execute the Directive 98/24/EC as well as amending the Commission Directive 2000/39/EC (Official Journal L 338 of 19.12.2009);

The derived no-effect levels (DNELs) for nickel - workers:

Acute exposure, inhalation, DNEL = 16mg Ni/m³

Chronic exposure, inhalation, DNEL = 0.05 mg Ni/m³

Chronic exposure, dermal, DNEL = 0.00044 mg Ni/cm²

The derived no-effect levels (DNELs) for nickel - the general public:

Acute exposure, inhalation, DNEL = 9.6 mg Ni/m³

Acute exposure, oral, DNEL = 0.012 mg Ni / kg / day

Chronic exposure, inhalation, DNEL = 0.00002 mg Ni/m³

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8.2 Exposure controls:**8.2.1 Appropriate engineering controls at industrial settings**

Necessary local exhaust ventilation with casing of the area of emission to the air environment and general ventilation of the room.

8.2.2 Individual protection measures, such as personal protective equipment

When the concentration of the substance is determined and known, the selection of personal protective equipment should be made taking into account the concentration of the substance present at a given workplace, exposure time, activities performed by the worker and recommendations provided by the manufacturer of personal protective equipment. In an emergency or when the concentration of the substance at the workplace is unknown, use personal protective equipment insulating the body (gas-tight suit complete with insulating respiratory protection equipment).

Eye/face protection: goggles, in case of dusting use protective goggles with face protection.

Hands protection: protective gloves.

Skin protection: protective clothing.

Respiratory ways protection: necessary when vapours/dusts are formed - anti-dust half mask of class P-3.

Thermal hazards: not applicable.

Hygiene means: Immediately change contaminated clothing. Decontaminate clothing in water before reuse. Wash your hands and face after working with the substance. Do not eat and drink during substance handling.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties:

- a) *Physical state:* fine-crystalline powder;
- b) *Colour:* yellow-green;
- c) *Odour:* odourless;
- d) *Melting point/freezing point:* anhydrous: 840 °C hexahydrate: 53 °C;
- e) *Boiling point or initial boiling point and boiling range:* n.a.;
- f) *Flammability:* n.a. inflammable product;
- g) *Lower and upper explosion limit:* n.a.;
- h) *Flash point:* n.a.;
- i) *Auto-ignition temperature:* n.a.;
- j) *Decomposition temperature:* at approx. 840 °C it decomposes with the release of nickel oxides and sulfur oxides; at approx. 190 °C it can sublime As_2O_3 ;
- k) *pH:* n.a.;
- l) *Kinematic viscosity:* n.a.;
- m) *Solubility:*
 - *in water: anhydrous form:* 293 g/l at 20 °C; 873g/l at 100 °C,
 - *in water: hexahydrate form* 625 g/l at 0 °C; 3407g/l at 100 °C,
 - *in acids (20 °C): depending on the type of acid and concentration,*
 - *in bases (20 °C): insoluble,*

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- *in organic solvents (20 °C): slightly soluble in alcohols, slightly soluble in ethanol, slightly better in methanol.*

- n) *Partition coefficient n-octanol/water (log value): n.a.;*
- o) *Vapour pressure: n.a.;*
- p) *Density and/or relative density: anhydrous: 3.68 g/cm³, hexahydrate: 2.07 g/cm³;*
- q) *Relative vapour density: n.a.;*
- r) *Particle characteristics: 0.662% below 100 µm.*

9.2 Other information:

None

SECTION 10. Stability and reactivity

10.1. Reactivity: When in contact with common metals, hydrogen releases. After heating up, the substance explosively reacts with aluminium and magnesium powder

10.2. Chemical stability: The substance is stable under normal conditions.

10.3 Possibility of hazardous reactions: Not known.

10.4 Conditions to avoid: High temperature, accidental incompatible materials contact.

10.5 Incompatible materials: Alkali and alkali soil metals - cause heating up, ignition of metal and explosion of released hydrogen. Contact with strong bases causes heating up of the mix and decomposition of NiSO₄ to nickel (II) hydroxide.

10.6 Hazardous decomposition products: In case of heating up to higher temperatures or fire, the following toxic products of decomposition are released: sulphur oxides (SO₂, SO₃), nickel oxides, arsenic oxides.

SECTION 11. Toxicological information

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

On the basis of Chemical Safety Report for nickel(II) sulfate(VI) the product meets the following classification criteria:

a) Acute toxicity:Acute toxicity (oral):

Due to the nickel(II) sulfate(VI) content product meets classification criteria as harmful after swallowing (**Acute Tox. 4; H302**).

After swallowing causes sharp pain, nausea, vomits, diarrhea, oral cavity, throat and gullet burns.

Acute toxicity (inhalation):

Due to the nickel(II) sulfate(VI) content product meets classification criteria as harmful after inhaling (**Acute Tox. 4; H332**).

Vapours/dust have toxic action, create serious health risk in long-term exposure, may cause cancer, mucosae burns, dyspnea, may cause sensitization.

Acute toxicity (skin contact):

on the basis of available data the classification criteria are not met.

Toxic and lethal doses and concentrations:**NiSO₄:**

LD₅₀ (rat/females, oral): 361.9 mg/kg,

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on the basis of available data the classification criteria are not met

i) Specific target organ toxicity — Repeated exposure:due to NiSO₄ content above concentration limit the product is classified as:**STOT RE 1; H372** - Causes damage to organs through prolonged or repeated exposure.

According to chemical safety assessment carried out for nickel(II) sulfate(VI) the respiratory way exposure causes danger in long-term or repeated exposure and damaged organs are lungs.

j) Aspiration hazard*on the basis of available data the classification criteria are not met.*Toxic action and other harmful actions for human body:

Arsenic and arsenic compounds are toxic for circulatory system, central and peripheral nervous system, liver and kidneys. Nickel causes disorders in the structure of nucleic acid leading to tumours of mouth, throat and lungs as well as nickel eczema.

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Information related to possible exposure ways, product properties related symptoms and possible product exposure effects described in section 4.2.

11.2 Information on other hazards:

None

SECTION 12. Ecological information

12.1. Toxicity:

On the basis of Chemical Safety Report for nickel(II) sulfate(VI) the product meets classification criteria as very toxic to aquatic life (**Aquatic Acute 1; H400**) and very toxic to aquatic life with long lasting effects (**Aquatic Chronic 1; H410**).

M factor for nickel (II) sulfate (VI) = 1.

Toxic concentration for aqueous animal and plant organisms:

NiSO₄:

LC₅₀/96h fish: *Oncorhynchus mykiss*: 15.3 mg/l

EC₅₀/48h crustaceans: *Ceriodaphnia dubia*: > 82.1 < 133.1 mg/l (depending on water hardness and alkalinity)

EC₅₀/72h algae: *Pseudokirchnerella subcapitata*: > 81.5 < 148 µg/l (depending on water hardness and pH)

H₃AsO₄:

LC₅₀/96h fish: *Cyprinodon variegatus*: 28 mg/l

EC₅₀/48h crustaceans: *Americamysis bahia*: 6.6 mg/l

EC₅₀/72h algae: no data

Predicted no effect concentrations (PNECs):

PNEC (surface water) – 3.6 µg soluble Ni/l

PNEC (marine water) – 8.6 µg soluble Ni/l

PNEC (soil) – 29.9 mg Ni/kg dry mass

PNEC (STP) – 0.33 mg Ni/l

PNEC birds, oral – 5.0 mg/kg wet mass

PNEC mammals, oral (rat) – 0.73 mg/kg wet mass

12.2. Persistence and degradability:

Product dissolves in contact with surface water. Environmental changes last until ions of Ni⁺² react with ions of S⁻², CO₃⁻² and precipitation of their sparingly soluble salts.

12.3. Bioaccumulative potential:

Nickel is easily bioaccumulated in phytoplankton and in other water plants. Daily human absorption varies in a range of 0.3-0.5 mg. Alimentary tract absorption in humans is below 10%. Low solubility compounds (metallic nickel dust, nickel sulfate and oxide) accumulate in lungs. Nickel sulfate solution is absorbed at 55-75% from skin in 24 hours. Nickel acquired with food and water is poorly absorbed and quickly excreted from organism. It is accumulated mainly in bones, parenchymal organs, heart and various glands. Nickel from the air is highly accumulated in lungs and transported to other organs.

12.4. Mobility in soil:

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Nickel is an element with high mobility in the natural environment, the system soil - plant plays an important role in its circulation in ecosystems. Cultivated plants differ in ability to absorb nickel, although it is usually easily absorbed proportionally to the concentration in the soil until it reaches toxic levels. Nickel as a micronutrient in trace amounts is essential for plants. However, there are large differences in phytoaccumulation and phytotoxicity of nickel, depending on plant species, as well as the form in which nickel is present in the soil. Very important are also properties of soil such as pH, particle size distribution, organic matter content, as well as the interaction between nickel and other trace elements, e.g. cadmium (Cd), copper (Cu), zinc (Zn).

12.5. Results of PBT and vPvB assessment:

Product is not classified as PBT and vPvB.

12.6. Endocrine disrupting properties:

Not applicable. The substance is **not** a substance 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.

12.7. Other adverse effects:

Not known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods:

Do not dispose of to sewage system. Do not let the substance to contaminate surface and underground water and soil. Do not dispose of together with municipal waste. Consider the opportunity to reuse. Store the waste on hazardous waste dump yards in tight and durable containers.

Waste management according to the Directive of the European Parliament and Council 2008/98/EC of November 19th, 2008 on waste (Official Journal EC L 312 of 22.11.2008, with subsequent amendments).

Disposable packages must be handed over to an authorized collector of package waste. Multiple use packages can be still used after previous cleaning.

Waste management according to the Directive of the European Parliament and Council 94/62/EC of December 20th, 1994 on packages and waste packages (Official Journal EC L 365 of 31.12.1994, with subsequent amendments).

SECTION 14: Transport information

14.1. UN number or ID number: 3077**14.2. UN proper shipping name:**

– ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

14.3. Transport hazard class(es): 9**14.4. Packing group:** III,**14.5. Environmental hazards:**

Due to toxic effects on aquatic organisms, means of transport should be labelled with the following pictogram:



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14.6. Special precautions for user: Avoid contact with the substance. Personal protection measures as described in section 8.8.2.

14.7. Maritime transport in bulk according to IMO instruments: n/a

SECTION 15: Regulatory information

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

Category of the substance according to Seveso III Directive/substances listed in the annex I to the Directive of the Council 2012/18/EC of July 4th 2012, on control of significant breakdowns hazard related to hazardous substances (Official Journal L 192, 08/07/1998, with subsequent amendments): dangerous for the environment.

The substance is not subject to Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer, Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC.

Provisions of law:

Commission Regulation (EU) 2020/878 of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Act of February 25th, 2011 on chemical substances and their mixtures (Official Journal 11.63.322); Regulation (EC) No. 1907/2006 of the European Parliament and Council of December 18th, 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC; Regulation of the European Parliament and Council (EC) No. 1272/2008 dated December 16th, 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006; Regulation of the European Parliament and Council (EC) No 1336/2008 of 16 December 2008 amending Regulation (EC) No 648/2004 in order to adapt it to Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (Official Journal L 354 from 31.12.2008); Regulation of the Minister of Labour and Social Policy of June 6th, 2014 on the highest allowable concentrations and intensities of substances harmful for health in the work environment (Official Journal No. 817); Act of August 19th, 2011 on transportation of hazardous goods (Official Journal 227.1367); Act of December 14th, 2012, on waste (Official Journal 0.21.2013); Regulation of the Board of Ministers of August 24th, 2004, on the list of works banned for adolescents and conditions of their employing for some works. (Official Journal 04.200.2047, with subsequent amendments).

15.2. Chemical safety assessment

Chemical safety assessment of the nickel(II) sulfate(VI) has been carried out.

SECTION 16: Other information

Amendments have been made to sections: 1.2 (the list of ES has been updated)

H phrases which have not been given in whole in sections 2-15:

H301 - Toxic if swallowed

H314 - causes severe skin burns and eye damage

H318 - Causes serious eye damage

Nickel sulphate dihydrate**Date of issue: 04.06.2003****Revision No./Revision date: 13 / 01.01.2023****H331** - Toxic if inhaled**H350i** - May cause cancer by inhalationExplanations of abbreviations and acronyms used in the MSDS:**CAS number** – means numerical identification assigned to chemical substance by the American organization named Chemical Abstract Service (CAS), enabling substance identification.**Index number** – it is an identification code given in part 3 of the annex VI to the Regulation of the European Parliament and Council (EC) No. 1272/2008 dated December 16th, 2008, on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006;**WE number** – the number assigned to chemical substance in EINECS - European Inventory of Existing Chemical Substances, or the number assigned to chemical substance in ELINCS – European List of Notified Chemical Substances or the number in chemical substances inventory included in “No-longer polymers” document.**Registration number** – number given by ECHA after substance/intermediate registration by the manufacturer/importer according to REACH Regulation.**UN number** – unequivocal marking of hazardous substances and goods assigned by United Nations Central Committee to provide international recognition and use.**IUPAC name** – name of a substance given by IUPAC - International Union of Pure and Applied Chemistry Committee**TLV-TWA** – the highest admissible concentration/threshold limit value – weighted average value – concentration of toxic chemical whose impact on a worker during 8-hour daily shift and average weekly time of work provided in the Labor Code during the period of his occupational activity should not cause negative changes of his health condition and of health condition of his next generations.**TLV-STEL** – the highest admissible short term concentration/short term exposure limit – weighted average of concentration of the specified, toxic chemical compound which should not cause negative changes of a worker's health if present in the work environment for not longer than 15 minutes and not more often than twice per shift with occurrences separated by more than 1 hour. and not more often than twice per shift with occurrences separated by more than 1 hour.**LD₅₀** – lethal dose - dose of toxic substance expressed in milligrams per kilogram of body mass necessary to kill 50% of the examined population within specified time.**LC₅₀** – lethal concentration - concentration of a substance in the inhaled air, expressed in milligrams per litre, which causes death of 50% of the examined population after specified period of exposure.**EC₅₀** – effect concentration - substance concentration expressed in milligrams per litre causing the given pharmacological effect (e.g. inhibition of growth) at 50% of the examined population within specified time.**TLV** - Maximum Permissible Concentration - the weighted average value of the concentration, the impact of which on the worker during the 8-hour daily and average weekly working time specified in the Labor Code, throughout the period of his professional activity, should not cause negative changes in his health and health of future generations.**TWA** - Temporary Maximum Allowable Concentration - the average value of the concentration that should not cause negative changes in the worker's health, if it occurs in the working environment

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for no more than 15 minutes and no more than 2 times during a work shift, at intervals of not less than 1 time.

Sources of information used during preparation of the MSDS:

- Own results of qualitative and quantitative analyses of nickel sulphate;
- Chemical Safety Report for nickel(II) sulfate(VI);
- Chemical Safety Report for sulphuric(VI) acid;
- ECHA: <https://echa.europa.eu/pl/information-on-chemicals/registered-substances>;
- TOXNET – Toxicology Data Network (<http://toxnet.nlm.nih.gov/>);

Necessary training: Post-related training within the scope of safe use of a substance considering its hazardous properties for human and the environment.

Information contained in the material safety data sheet is to describe the product within the scope of safety requirements. User is responsible for taking any steps in order to meet the provisions of the national law and to create safe conditions for use of the product. User is held responsible for effects resulting from improper application of this product.

Further information can be obtained under the telephone numbers given in section 1.