

Date of release / date of revision: 4 June 2003 / 21 January 2014

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

1.1. Product identifier:

Trade name: NICKEL SULPHATE DIHYDRATE

UN No.: 2923

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

Use: Apart from the nickel oxide, technically the most significant chemical compound of nickel. An starting product for the production of catalysts and other nickel compounds. It is used in electroplating baths – for nickel electroplating, for production of nickel catalysts, for production of paints and varnishes, in ceramics.

Uses advised against: the product cannot be available to the general public.

1.3. Details of the supplier of the safety data sheet:

KGHM Polska Miedź S.A.
Oddział Huta Miedzi Legnica
Złotoryjska 194
59-220 Legnica

Telephone number: *Head of Copper Electrefining Department: (48 76) 747 53 01 lines open Mon-Fri 7:15 am - 3:15 pm*
Head of Customer Service Section and End Product Warehouse: (48 76) 747 28 00 lines open Mon-Fri 7:15 am - 3:15 pm

Telefax: 076/747 20 05

Person responsible for the Safety Data Sheet: (48 76) 747 52 06 / e-mail: karty.charakterystyki@kgbm.pl

Producer's emergency telephone number: (48 76) 747 50 02 – lines open round the clock

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation No. 1272/2008 (CLP):

Carc. 1A; H350 – May cause cancer;

Muta. 2; H341 – Suspected of causing genetic defects;

Repr. 1B; H360D – May damage fertility or 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 Corr. 1B; H314 – Causes severe skin burns and eye damage;

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;

Met. Corr 1; H290 – May be corrosive to metals;

Aquatic Acute 1; H400 – Very toxic to aquatic life;

Aquatic Chronic 1; H410 – Very toxic to aquatic life with long lasting effects.

Classification according to Directive No. 67/548/EWG

Carc. Cat. 1; R45 – May cause cancer;

Repr. cat. 2; R61 – May cause harm to the unborn child;

Xn; R20/22 – Harmful if swallowed and if inhaled;

C; R34 – Causes burns;

R42/43 – May cause sensitisation by inhalation and by skin contact;

T; R48/23 – Toxic by inhalation; Danger of serious damage to health by prolonged exposure;

Muta. Cat. 3; R68 – Possible risk of irreversible effects;

N; R50/53 – Very toxic to aquatic organisms; May cause long-term adverse effects in the aquatic environment

2.2. Label elements:

Package label:

"Product exclusively intended for professional use"

GHS05



GHS 07



GHS 08



GHS 09



Warning signal: "DANGER".

Hazard statements (H):

H350 – May cause cancer.

H341 – Suspected of causing genetic defects.

H360D – May damage fertility or the unborn child.

H372 – Causes damage to organs through prolonged or repeated exposure.

H302 – Harmful if swallowed.

H332 – Harmful if inhaled.

H314 – Causes severe skin burns and eye damage.

H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H317 – May cause an allergic skin reaction.

H290 – May be corrosive to metals.

H400 – Very toxic to aquatic life.

H410 – Very toxic to aquatic life with long lasting.

Statements defining the conditions of safe use (P):

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

P314 – Get Medical advice/attention if you feel unwell.

P501 – Dispose of contents/container to the product manufacturer.

P273 – Avoid release to the environment.

P405 – Store locked up.

P406 – Store in a corrosive resistant container with a resistant inner liner.

The other compulsory label elements are stated in Title III of the Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 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 as amended.

2.3 Other hazards:

Upon heating to higher temperatures, toxic decomposition products such as As_2O_3 , SO_2 , SO_3 are released. In the temperature over 840 °C toxic nickel (II) oxide is released. The substance reacts with most metals releasing flammable hydrogen.

The product does not fulfil the classification criteria as PBT and vPvB.

SECTION 3. Composition and information on ingredients

3.1 Substances

Not applicable

3.2 Mixtures

According to Regulation No. 1272/2008 (CLP)

No.	Substance name	CAS No.	EC No.	Index No.	Content [mass fraction in %]	Symbols	H phrases	REACH registration No.
1.	Nickel (II) sulphate (VI) $NiSO_4 \cdot x n H_2O$ (n = 1, 2, 4)	7786-81-4	232-104-9	028-009-00-5	$88 \leq c \leq 96$	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 Acute 1 Aquatic Chronic 1	H350i H341 H360D H372 H302 H332 H315 H334 H317 H400 H410	01-2119439361-44-0003

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2.	Sulphuric (VI) acid H_2SO_4	7664-93-9	231-639-5	016-020-00-8	$c \leq 10$	Skin. Corr. 1A	H314	01-2119458838-20-0041
3.	Arsenic (V) acid H_3AsO_4	7778-39-4	231-901-9	033-005-00-1	$\leq 0,5$	Carc. 1A Acute Tox. 3 Acute Tox. 3 Aquatic Acute 1 Aquatic Chronic 1	H350 H301 H331 H400 H410	Impurity considered in the registration documentation of nickel sulphate

According to Directive No. 67/548/EEC

No.	Substance name	CAS No.	EC No.	Index No.	Content [mass fraction in %]	Symbols	R phrases	REACH registration No.
1.	Nickel (II) sulphate (VI) $NiSO_4 \times n H_2O$ (n = 1, 2, 4)	7786-81-4	232-104-3	028-009-00-5	$88 \leq c \leq 96$	Carc. cat. 1; Repr. cat. 2; Muta. cat. 3; T; Xn; Xi; N	49-61-20/22-38-42/43-48/23-68-50/53	01-2119439361-44-0003
2.	Sulphuric (VI) acid H_2SO_4	7664-93-9	231-639-5	016-020-00-8	$c \leq 10$	C	35	01-2119458838-20-0041
3.	Arsenic (V) acid H_3AsO_4	7778-39-4	231-901-9	033-005-00-1	$\leq 0,5$	Carc. cat. 1; T; N	45-23/25-50/53	Impurity considered in the registration documentation of nickel sulphate

SECTION 4. First aid measures

4.1 Description of first aid measures:

Inhalation: provide calmness, fresh air and medical aid. With the hazard of the loss of consciousness, apply recumbent position, transport in stable lateral position. Medical aid necessary. Apply artificial respiration if needed.

Skin contact: remove contaminated clothing. Areas of skin that have come into contact with the product must be washed thoroughly with water and soap. If skin irritation persists, seek dermatological assistance.

Eye contact: with the eyelids widely open, rinse the eyes with plenty of running water (protect the eye that has not come into contact with the product, remove contact lenses), ophthalmological check-up examination.

Ingestion: rinse the mouth immediately. Call medical aid immediately.

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

Ways of exposure: alimentary tract, respiratory tracts, skin, eyes.

- Respiratory tracts: vapour / dusts are toxic, they pose serious health hazard and as a result of prolonged exposure may cause cancer, they cause mucosa burns, breath shortness, may cause sensitization;
- Alimentary tract: swallowing causes acute pain, nausea, vomiting, diarrhoea, burns of the mouth, throat, oesophagus;
- Skin contact: causes burns, ulceration, may cause sensitization;
- Eye contact: vapour / dusts cause burns of the eyelids and eyeballs.

Acute intoxication symptoms: product in the form of vapour and dusts causes pain, eye lacrimation, burns of conjunctivas and cornea, sore throat, cough, reflex shallow breathing and tachypnoea, breath shortness, glottic spasm, glottic oedema, bronchospasm, pulmonary oedema. Death can occur as a result of glottic spasm. Skin contamination causes serious burns. Repeated skin exposure may cause ulceration, nail lesions, sensitization. Eye contamination causes burns of eyelids, eyeballs and their permanent injury. By the alimentary tract it causes burns of the mouth, throat, oesophagus, it causes severe stomach aches, it may cause perforation of the oesophagus, stomach, alimentary tract haemorrhages, intense diarrhoea, bloody stools, shock. Acute intoxication results in anaemia with leucopenia, polyneuronal lesions, hepatocellular damages, psychotic conditions, desquamative skin inflammation.

Long-lasting exposure: Repeated skin contact with the product causes sensitization lesions in its area; repeated respiratory tracts contact may cause bronchial asthma and the hazard of the mouth, fauces and lung neoplasm. Long-lasting contact with sulphuric (VI) acid vapours may cause long-lasting conjunctivitis, epistaxis, long-lasting bronchitis. Repeated skin exposure may cause ulceration, nail lesions, tooth enamel damage.

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

In the case of swallowing, the patient should drink a lot of water with the addition of a considerable amount of activated charcoal and magnesium oxide, induce vomiting, and then take laxative.

SECTION 5. Firefighting measures**5.1. Extinguishing media:**

Suitable extinguishing media: a solid substance, non-flammable, apply extinguishing media depending on the materials stored nearby: water (if the packaging is tight) – spray, carbon dioxide, dry powders, foam extinguishers, sand.

Unsuitable extinguishing media: Not known.

5.2. Special hazards arising from the substance or mixture:

In the fire sulphur dioxide and / or sulphur trioxide may be released.

First actions in the case of fire: The product itself is non-flammable. Cool the product and containers engulfed by fire with sprayed water, cover with foam and, when possible, remove from the hazard area. Apply suitable extinguishing media on the area around the fire.

5.3. Advice for firefighters:

Fire fighters should be equipped with gas-tight protective clothing and self-contained breathing apparatus. The actions of product removal should be taken with respiratory tract protective equipment, face mask and protective clothing. Stop the extinguishing water from being discharged to surface water or underground water.

SECTION 6. Accidental release measures

General recommendation: In the case of nickel (II) sulphate (VI) release to the environment, the contaminated area must be isolated. First, the source of environment contamination must be cut off. If needed, call rescue service. Protect water sources and sewage systems. While cleaning, avoid dust rising.

6.1. Personal precautions, protective equipment and emergency procedures:

Persons who do not take part in the rescue action must be removed from the hazard area. Apply individual protection means mentioned in section 8.

6.2. Environmental precautions:

In the case of accident, stop from disposal to the environment. Prevent from being discharged into drains. Try to collect, as far as possible, into suitable containers for further utilisation.

6.3. Methods and material for containment and cleaning up:

Protect the surface from product spill. Eliminate leakages (tighten the damaged packaging and place in protective packaging). Collect the spilled substance into a container and remove as hazardous waste. In the case of solutions, collect the spilled product with absorbing means (diatomaceous earth, sand or other absorbent which does not react with the product) into a container with a lid. The contaminated ground is subject to exchange.

6.4. Reference to other sections:

Individual protection means are described in section 8.2.2. Proceedings with the waste are given in section 13.

SECTION 7. Handling and storage**7.1. Precautions for safe handling:**

Avoid creating aerosols at the workplace. Use only small amounts of the product in a properly labelled room with ventilation in good working order. The protective means for product spills should be available at the workplace. The containers with the product should be labelled. The containers, when not in use, must be closed. Empty containers may contain residues which are dangerous. When handling the product, do not eat, do not drink and do not smoke. Wash your hands, when using the product, before eating a meal. Do not swallow. The rooms must have proper exhaust ventilation. The workplace should be equipped with safety shower (for washing the whole body) and a separate shower (spray shower) for rinsing the eyes.

7.2. Conditions for safe storage, including any incompatibilities:

Store always in original, tight, properly labelled packaging. Protect the packaging against damage. Properly label the place of product storage, which should be accessible only to properly trained persons.

Requirements concerning ventilation: The rooms must have proper local exhaust ventilation with an enclosure of the area of emission to the air environment as well as the room general ventilation. In the case of insufficient ventilation, apply proper individual protection of the respiratory tract.

Other information: Do not use contaminated, empty packaging for other purposes.

7.3. Specific end use(s):

Identified uses are listed in section 1.2.

SECTION 8. Exposure controls and personal protection

8.1. Control parameters:

Threshold limit values which need to be controlled:

No.	Substance name	CAS No.	TLV [mg/m ³]	TLV-STEL [mg/m ³]
1.	Nickel and its compounds, excluding nickel tetracarbonyl – as calculated for Ni	-	0,25	-
2.	Sulphuric (VI) acid: - mists - thoracic fraction ⁽¹⁾	7664-93-9	1 0,05	3
3.	Arsenic and its inorganic compounds as calculated for As	-	0,01	-

(1) Thoracic fraction – aerosol fraction entering the respiratory tracts in the chest area, which poses health hazard upon being deposited in the tracheal and bronchial area as well as in the gas exchange area.

Threshold limit values which need to be controlled (consumers):

No.	Substance name	CAS No.	TLV-TWA [mg/m ³]	TLV-STEL [mg/m ³]
1.	Nickel soluble compounds, excluding nickel tetracarbonyl – as calculated for Ni Nickel compounds as calculated for Ni Nickel soluble salts – as calculated for Ni	-	0,1 (ACGIH-TWA, USA) 1 (OSHA PEL, USA) 0,1 (MEL, Great Britain) 0,1 (TWA, Belgium) 0,1 (HTP, Finland) 0,05 (MAK-Wert, Germany)	- - - - - -
2.	Sulphuric (VI) acid Sulphuric acid (fumes) ⁽¹⁾⁽²⁾	7664-93-9	0,2 (ACGIH-TWA, USA) 1 (OSHA-PEL, USA) 0,2 (HTP, Finland) 0,1(MAK-Wert, Germany) 0,05 (European Union)	3 (ACGIH-TWA, USA) - 1 (HTP, Finland) 0,1(MAK-Wert, Germany) -
3.	Arsenic and its inorganic compounds as calculated for As Arsenic and its compounds excluding arsenic hydride as calculated for As	-	0,01 (ACGIH-TWA, USA) 0,01 (HTP, Finland) 0,1 (TWA, Great Britain)	- - -

(1) While choosing a suitable exposure monitoring method, one should consider possible limitations and disturbances which may arise in the presence of other sulphur compounds.

(2) Fumes are defined as thoracic fraction.

Legal basis:

Regulation of the Minister of Labour and Social Policy of 29 November 2002 on highest permissible concentrations and intensity of agents harmful for health in work environment. (Dz.U. [Journal of Laws] 02.217.1833 as amended);

According to Commission Directive 91/322/EEC of 29 May 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 work (OJ L 177, 5.7.1991 as amended) according to Commission Directive 2000/39/EC 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 work (OJ L 142, 16.6.2000 as amended);

Commission Directive 2009/161/EU - indicative occupational exposure limit values of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC (OJ L 338, 19.12.2009 as amended).

Derived no-effect levels (DNEL) of nickel – workers:

- Acute exposure, inhalation, DNEL = 16mg Ni/m³
- Long-term exposure, inhalation, DNEL = 0,05 mg Ni/m³
- Long-term exposure, dermal, DNEL = 0,00044 mg Ni/cm²

Derived no-effect levels (DNEL) of nickel – the general population:

- Acute exposure, inhalation, DNEL = 9,6 mg Ni/m³
- Acute exposure, oral, DNEL = 0,012 mg Ni/kg/a day
- Long-term exposure, inhalation, DNEL = 0,00002 mg Ni/m³

8.2. Exposure controls:

Suitable technical control means:

Information contained in the exposure scenarios enclosed to the present safety data sheet.

Individual protection means, such as individual protection equipment:

Eye and face protection:

Use protective goggles with face shield.

Hand protection:

Protective gloves.

Skin protection:

Acid-proof clothing.

Respiratory tract protection:

Necessary when vapours / dusts are released – a mask with an acid vapour absorber / a dust mask with a filter of a class suitable for determined concentrations in the air,

In an emergency, if product concentration is not known, use equipment isolating the respiratory tract from the work environment.

Thermal hazard:

Not applicable.

Hygiene means:

Change the contaminated clothing immediately. Clean the contaminated clothing before reuse. Wash your hands and face after working with the product. Do not eat and do not drink while working with the product.

Environment exposure control:

Environment exposure should be controlled in accordance with current national legislation concerning environment protection.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties:

Appearance: *solid body of yellow colour*

Odour: *odourless*

Odour threshold: *not applicable.*

Saturated solution pH: *approx. 1 (100 g/l H₂O, 20°C)*

Melting / freezing point: *loses crystallization water in the temp. 103 0°C ÷ 110 0°C, waterless melts in the temp. 280 0°C / not determined*

Initial boiling point and boiling temperature range: *not applicable.*

Flash point: *not applicable – incombustible*

Evaporation rate: *not applicable.*

Combustibility: *not applicable.*

Explosive limits: *not applicable.*

Vapour pressure: *not applicable.*

Vapour density: *not applicable.*

Relative density: *waterless form 3,68 g/cm³, hexahydrate form 2,07 g/cm³*

Bulk density: *approx. 1800 kg/m³*

Solubility:

in water: waterless form 293g/l in the temp. 20 °C ; 873g/l in the temp. 100 °C

in organic solvents: a little soluble in alcohols, poorly soluble in ethanol, a bit better in methanol.

N-octanol / water coefficient: *not applicable.*

Autoignition temperature: *not applicable.*

Breakdown temperature: *not applicable.*

Viscosity: *not applicable.*

Explosive properties: *not applicable.*

Oxidizing properties: *not applicable.*

9.2. Other information: *None.*

SECTION 10. Stability and reactivity

10.1. Reactivity: *Hydrogen is released upon contact with common metals. When heated, the product react explosively with aluminium and magnesium powder.*

10.2. Chemical stability: *Stable in regular conditions.*

10.3. Possibility of hazardous reactions: *Not known.*

10.4. Conditions to avoid: high temperature.

10.5. Incompatible materials: *strong acids, aluminium, magnesium. Nickel sulphate reacts explosively with aluminium or magnesium powder upon heating. Poor corrosive properties.*

10.6 . Hazardous decomposition products: *in high temperatures sulphur oxides SO_x, nickel oxides, arsenic oxides are released*

Consecutive data: *releases crystallization water upon heating.*

SECTION 11. Toxicological information

11.1. Information on toxicological effects:

Acute toxicity:

Acute toxicity (ingestion):

Because of the content of nickel (II) sulphate (VI) and arsenic (III) oxide, the product was classified as acting harmfully upon ingestion (Acute Tox. 4; H302).

When swallowed, it causes acute pain, nausea, vomiting, diarrhoea, burns of mouth, throat oesophagus.

Acute toxicity (upon inhalation exposure):

Because of the content of nickel (II) sulphate (VI) and sulphuric (VI) acid, the product was classified as acting harmfully upon inhalation (Acute Tox. 4; H332).

Vapour / dusts act toxically, pose serious health hazard as a result of long-term exposure, may cause cancer, cause mucosa burns, breath shortness, may cause sensitization.

Acute toxicity (being deposited on skin):

Based on the available data, the classification criteria are not met.

Lethal and toxic doses and concentrations:

NiSO₄:

LD50 (rat/female, oral): 361,9 mg/kg,

LC50 4h (rat, inhalation): 2,48 mg/l,

LD50 (rat, oral): no credible data.

H₂SO₄:

LD50 (rat, oral): 2140 mg/kg,

LC50 (rat, inhalation): 375 mg/m³,

LC50 4h (mouse, inhalation): 0,85 mg/l,

LC50 8h (mouse, inhalation): 0,6 mg/l,

LD50 (rat, oral): no data.

H₃AsO₄:

LD50 (mouse / female, oral): 160,4 mg/kg,

LD50 (mouse / male, oral): 141,4 mg/kg,

LC50 4h (mouse / female, inhalation): 1,153 mg/l,

LC50 4h (mouse / male, inhalation): 0,794 mg/l,

LD50 (rabbit/ female, oral): 2300 mg/kg

LD50 (rabbit/ male, oral): 1750 mg/kg

Skin corrosion / irritation:

Because of the product pH (approx. 1) the product was classified as:

Skin Corr. 1; H314 – Causes severe skin burns and eye damage.

Serious eye damage / eye irritation:

Because of the product pH (approx. 1) the product was classified as:

Eye Dam. 1; H318 – Causes serious eye damage.

Skin Corr. 1; H314 – Causes severe skin burns and eye damage.

Respiratory / skin sensitization:

Because of the NiSO₄ content above the concentration limit, the product was classified as:

Skin Sens. 1; H317 – May cause an allergic skin reaction;

Resp. Sens. 1; H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Reproductive cell mutagenicity:

Because of the NiSO_4 content above the concentration limit, the product was classified as:
Muta. 2; H341 – Suspected of causing genetic defects.

Carcinogenicity:

Because of the content of NiSO_4 , arsenic (V) acid above the concentration limit, the product was classified as:
Carc. 1A; H350i – inhalation may cause cancer.

Reproductive toxicity:

Because of the NiSO_4 content above the concentration limit, the product was classified as:
Repr. 1B; H360D – May damage the unborn child.

Specific target organ toxicity — single exposure:

Based on the available data, the classification criteria are not met.

Specific target organ toxicity — repeated exposure:

Because of the NiSO_4 content above the concentration limit, the product was classified as:
STOT RE 1; H372 – Causes damage to organs through prolonged or repeated exposure.
In accordance with the chemical safety assessment carried out for nickel (II) sulphate (VI), the respiratory tract is the way of exposure which poses hazard by long-term or repeated exposure, and lungs are the organ which is damaged.

Aspiration hazard:

Based on the available data, the classification criteria are not met.

Human toxicity:

Arsenic and arsenic compounds act toxically on the circulatory system, central and peripheral nervous system, liver, kidneys. Prolonged exposure to arsenic (III) oxide and its salts leads to neoplasms of skin, lungs, kidneys, liver, and sometimes bladder. Nickel causes disorders in the nucleic acid structure leading to neoplasms of mouth, fauces and lungs as well as nickel eczema.

Additional information:

Information concerning possible ways of exposure, symptoms connected with the product properties and possible product exposure results are described in section 4.2.

SECTION 12. Ecological information

12.1. Toxicity:

Based on the data contained in the Chemical Safety Report for nickel (II) sulphate (VI), the product meets the 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)
The M coefficient for nickel (II) sulphate (VI) = 1.

Toxic concentrations for aquatic animal and vegetal life:

NiSO_4 :

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)

H_2SO_4 :

LC50/96h fish: *Lepomis macrochirus*: > 16 < 28 mg/l

EC50/48h crustaceans: *Daphnia magna*: > 100mg/l

EC50/72h algae: *Desmodesmus subspicatus*:

H_3AsO_4 :

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

EC50/48h crustaceans: *Americamysis bahia*: 6,6 mg/l

EC50/72h algae: no credible data

Predicted no-effect concentration of nickel (PNEC):

PNEC (surface waters) – 3,6 µg of dissolved Ni/l

PNEC (sea waters) – 8,6 µg of dissolved Ni/l

PNEC (soil) – 29,9 mg Ni/kg of dry matter

PNEC (municipal sewage treatment plant) – 0,33 mg Ni/l
 PNEC for birds, if swallowed – 5,0 mg/kg of wet matter
 PNEC for mammals, if swallowed (rat) – 0,73 mg/kg of wet matter

12.2. Persistence and degradability:

The product, when penetrates into surface waters, is dissolved. Changes in the environment last until Ni+2 ions react with S-2, CO3-2 ions and their salts sparingly soluble in water precipitate.

12.3. Bioaccumulative potential:

Nickel easily undergoes bioaccumulation in phytoplankton and other water plants. Daily nickel absorption by humans ranges in the limit of 0,3-0,5 mg. Humans absorb nickel from the alimentary tract at the rate lower than 10%. Poorly soluble compounds (nickel metallic dust, nickel sulphide and oxide) accumulate in the lungs. Nickel sulphate solution, deposited on human skin, is absorbed after 24 hrs. at the rate 55-75%. Nickel taken with food and water is poorly absorbed and quickly excreted from the body. It accumulates mainly in the bones, parenchymatous organs, cardiac muscle, skin and various glands. Nickel inhaled with atmospheric air is to a large extend accumulated in the lungs and also moved to other organs.

12.4. Mobility in soil:

Nickel is an element of great mobility in the natural environment, the system soil – plant plays significant role in its circulation in ecosystems. Naturally existing nickel in soils comes from magmatic rock weathering. It is an element strongly connected with the organic matter of the soil. Its solubility rises along with soil acidification. Liming reduces the intake of Ni by plants. Cultivated plants vary in the ability of absorbing nickel, although usually it is absorbed easily and in the degree proportional to the concentration in the soil, until it reaches toxic level. Nickel excess may cause photosynthesis disorders, or nitrogen fixations. Nickel as a microelement in trace amounts is necessary for plants. However, there are big differences in nickel phytoaccumulation as well as phytotoxicity depending on plant species and on the form that nickel exists in the soil. The following soil properties are also of great importance well: pH, grain composition, organic matter content, as well as interactions between nickel and other trace elements, e.g. cadmium (Cd), copper (Cu), zinc (Zn).

12.5. Results of PBT and vPvB assessment: The product is not classified as PBT and vPvB.

12.6. Other adverse effects: no data

SECTION 13. Disposal considerations**13.1. Waste treatment methods:**Destruction and neutralisation

Do not dispose to the sewage system. Prevent surface waters, underground waters and soil from contamination. Do not dispose along with municipal waste. Consider the possibility of reuse. Waste should be disposed at hazardous waste grounds in tightly closed and durable packaging.

Manage the waste in accordance with European Parliament and of the Council Directive 2008/98/EC of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008).

Packaging: Transfer used disposable packaging to an authorised package waste receiver. Multiple use packaging can be used again after cleaning.

Manage the packaging in accordance with European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste (OJ L 365, 31.12.1994, as amended)

SECTION 14. Transport information

UN number: UN 2923

UN proper shipping name: RID: CORROSIVE MATERIAL, SOLID, TOXIC, N.O.S.
 ADR: CORROSIVE MATERIAL, SOLID, TOXIC, N.O.S.

Classification class / code: 8 / CT2

Packing group: III

Environmental hazards: Because of the half-finished product toxicity to aquatic life, the means of transport should be additionally labelled with the sign "dead tree / dead fish"

Special precautions for users: Do not allow the packaging to be damaged. In the case of unintentional product release: eliminate the leakage (tighten the damaged packaging and place in protective packaging). Collect the spilled substance into a container (acid-proof) and remove as hazardous waste. Individual protection means are described in subsection 8.2.2.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable.

Material trade name:	NICKEL SULPHATE
Limited quantities:	LQ24/E1
Means of transport labelling:	Warning label no. 8, 6.1 and Symbol: "Dead tree / dead fish"
Special regulations	274



Packing instructions:	ADR: P002, IBC08, RID: P002, DPPL08;
Hazard identification number:	86
Other data:	Contains up to 10 % H ₂ SO ₄

SECTION 15. Regulatory information

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

Nickel (II) sulphate (VI) is not included in the legislation of Regulation (EC) no. 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer (OJ L 244, 29.9.2000 as amended) or 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 (OJ L 158, 30.4.2004 as amended).

Nickel (II) sulphate (VI) is not included in the legislation of Regulation (EC) no. 689/2008 of the European Parliament and of the Council of 17 June 2008 concerning the export and import of dangerous chemicals (OJ L 204, 31.7.2008 as amended).

The category of nickel (II) sulphate (VI) according to Seveso directive / substances listed in Annex I to Council directive 96/82/EC: dangerous for the environment.

Nickel compounds are listed in Annex X to Decision No. 2455/2001/EC of the European Parliament and of the Council of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC (OJ L 331, 15.12.2001).

Legal regulations:

Chemical substances and their mixtures act of 25 February 2011 (Dz.U.11.63.322.); Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 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 (EU OJ L136 of 29 May 2007 r. as amended); Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 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 (EU OJ L 353 of 31 December 2008 as amended); Commission Regulation (EU) No. 453/2010 of 20 May 2010 amending Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (OJ L 133 as amended); Regulation (EC) No. 1336/2008 of the European Parliament and of the Council 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 (EU OJ L 354 of 31 December 2008); Regulation of the Minister of Labour and Social Policy of 29 November 2002 on highest permissible concentrations and intensity of agents harmful for health in work environment (Dz.U.02.217.1833 as amended); Regulation of the Minister of Health of 01 February 2004 on carcinogenic or mutagenic substances, preparations, agents or technology processes in work environment (Dz. U.04.280.2771); Dangerous goods transport act of 19 August 2011 (Dz.U. 2011 no. 227 item 1367 2012.01.01); Waste act of 14 December 2012 (Dz.U. 2013 no. 0 item 21); Package and package waste management act of 13 June 2013 (Dz.U. 2013 no. 0 item 888); Regulation of the Cabinet of Ministers of 24 August 2004 on the list of works prohibited for minors and the conditions of their employment at some of such works (Dz.U.04.200.2047 as amended); Regulation of the Cabinet of Ministers of 10 September 1996 on the list of works prohibited for women (Dz. U. No. 114, item 545 as amended).

15.2. Chemical safety assessment:

Chemical safety assessment was prepared for nickel (II) sulphate (VI). The Chemical Safety Report is available at KGHM Polska Miedź S.A.

SECTION 16. Other information

Content of the R and H phrases which were not given in whole in sections 2 -15:

- R23/25 – Toxic by inhalation and if swallowed.
 R35 – Causes severe burns.
 R38 – Irritating to skin.
 R49 – May cause cancer by inhalation.
 H301 – Toxic if swallowed.
 H315 – Causes skin irritation.
 H318 – Causes serious eye damage.
 H331 – Toxic if inhaled
 H350i – May cause cancer by inhalation.

Explanation of abbreviations and acronyms used in the safety data sheet:

CAS Number – a numerical identifier assigned to the chemical substance by an American organisation Chemical Abstracts Service (CAS) allowing to identify the substance

EC number – a number assigned to the chemical substance in the European Inventory of Existing Chemical Substances (EINECS), or a number assigned to the substance in European List of Notified Chemical Substances (ELINCS), or a number on the list of chemical substances mentioned in the "No-longer polymers" publication.

Index number – an identification code given in part 3 of Annex VI of Regulation (EC) No. 1272/2008 on classification, labelling and packaging of substances and mixtures.

Registration number – a number given by the European Chemicals Agency (ECHA) upon registration of the substance / half-finished product by a manufacturer / importer in accordance with REACH Regulation.

NOEC – no observed effect concentration – the concentration of a pollutant that will not harm the species involved, with respect to the effect that is studied

LOEC – lowest observed effect concentration expressed in mg/litre.

EC₅₀ – the substance dose expressed in mg/litre, causing a given pharmacological effect (e.g. growth inhibition) with 50% of the tested population in specified period of time.

LD₅₀ – toxic substance dose, expressed in milligrams per kg of the body mass, needed to kill 50% percent of the tested population

LC₅₀ – substance concentration in the inhaled air, expressed in mg/l, which causes death of 50% of the tested population after a specified time of inhalation.

TLV-TWA – threshold limit value - time weighted average – weighted average concentration value to which a worker can be exposed day after day for a working lifetime (on the basis of a 8h/day, 40h/week work schedule) without adverse health effects

TLV-STEL – threshold limit value - short term exposure limit – average concentration value of spot exposure for a duration of 15 minutes, that cannot be repeated more than 2 times per working shift with at least 60 minutes between exposure periods, without adverse health effects

TVL-C – threshold limit value - ceiling limit – concentration value that should not be exceeded at any time at the work environment because of health or life hazard

IARC - International Agency for Research on Cancer – a WHO department located in Lyon, France, dealing with classification of carcinogenic agents and substances.

Necessary trainings: position vocational guidance in the scope of safe substance use considering its properties hazardous for humans and harmful to the environment.

Information sources used for developin the Safety Data Sheet:

- Own results of nickel sulphate quantity and quality analyses
- Dangerous Substances Practical Handbook ALFA-WEKA
- Dangerous substances safety data sheets (nickel sulphate) POCH
- European Chemical Substance Information System.
- Technology Encyclopaedia CHEMISTRY. WNT
- CHEMISTRY structure and reactions. Milton K.Snyder
- Chemical Safety Report for nickel (II) sulphate (VI), 2010;

All the data are based on the current state of our knowledge. Receivers of our product must take into consideration existing legal regulations and other legislation.

The present data sheet is the property of KGHM Polska Miedź S.A. Oddział Huta Miedzi Legnica and characterises our product exclusively.

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

Safety Data Sheet

Revision no. 10

Changes made

In sections 2, 3, 8, 11, 12, 15, 16

The data sheet was revised by:

Hubert Opaczewski

Approved by: