

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	Nickel sulfate
Chemical formula	NiSO ₄ ·6H ₂ O
Manufacturer	SUMITOMO METAL MINING CO., LTD. NON-FERROUS METALS DIV./ADMINISTRATION DEPT. 3-5-3, NISHIBARA-CHO, NIIHAMA, EHIME, 792-8555 JAPAN TEL +81- 897-37-4817 FAX +81- 897-37-4910
Product use	This material is used for Nickel plating, Coloring for aluminum surface, Catalysts, and Electric cells.

2. HAZARDS IDENTIFICATION

GHS classification

Physical hazards:

Explosives	Outside scope of the classification
Flammable gases	Outside scope of the classification
Flammable aerosols	Outside scope of the classification
Oxidizing gases	Outside scope of the classification
Gases under pressure	Outside scope of the classification
Flammable liquids	Outside scope of the classification
Flammable solids	Not classified
Self-reactive substances and mixtures	Classification not possible
Pyrophoric liquids	Outside scope of the classification
Pyrophoric solids	Not classified
Self-heating substances and mixtures	Not classified
Substances and mixtures which, in contact with water, emit flammable gases	Not classified
Oxidizing liquids	Outside scope of the classification
Oxidizing solids	Classification not possible
Organic peroxides	Outside scope of the classification
Corrosive to metals	Classification not possible

Health hazards:

Acute toxicity – oral	Category 4 (see the following index 11.)
Acute toxicity – dermal	Classification not possible
Acute toxicity – inhalation (gases)	Outside scope of the classification
Acute toxicity – inhalation (vapors)	Classification not possible
Acute toxicity – inhalation (dust, mist)	Classification not possible
Skin corrosion/irritation	Classification not possible
Serious eye damage/eye irritation	Classification not possible
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Germ cell mutagenicity	Not classified
Carcinogenicity	Category 1A

Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 1(central nervous system, respiratory organ)
Specific target organ toxicity (repeated exposure)	Category1 (respiratory organ, kidney, testis)
Aspiration hazard	Category 2(liver)
Environmental hazards:	Classification not possible
Hazardous to the aquatic environment - acute toxicity	Category 2
Hazardous to the aquatic environment - chronic toxicity	Category 2

HAZARDS EXCLUDED FROM THE GHS CLASSIFICATION CATEGORIES

HEALTH HAZARDS

- Seriously irritate the eyes, membrane of respiratory tract or skin.
- If swallowed large amount, may cause displeasure, nausea, giddiness, fatigue, headache, vomiting, diarrhea, cough, rapid breathing, temporary half-blindness.
- The increased rate of chromosomal aberration was observed in human peripheral lymphocyte who exposed occupationally to nickel chloride or nickel sulfate.
- In the epidemiological studies in the workers occupationally exposed to nickel oxide, nickel sulfate or nickel chloride, it is reported that the exposure may cause lung and nasal cavity cancer.
- The effects on nasal cavity, lung, testis, liver, heart and intestinal tract were observed in the repeatedly dosed animal study.

PICTOGRAM



SIGNAL WORD DANGER

HAZARD STATEMENT

- Toxic if swallowed.
- May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- May cause an allergic skin reaction.
- May cause cancer.
- Suspected of damaging fertility or the unborn child.
- Causes damage to organs <central nervous system, respiratory organs>
- Causes damage to organs <respiratory organs, kidney, testis> through prolonged or repeated exposure.
- May cause damage to organs <liver> through prolonged or repeated exposure.
- Very toxic to aquatic life.

PRECAUTIONARY STATEMENTS

[Prevention]

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

- Wear personal protector or use ventilator to avoid exposure.
- In case of inadequate ventilation, wear respiratory protection.
- Avoid breathing dust or fume.
- Do not eat, drink, or smoke during work.
- Wash hands thoroughly after handling.
- Avoid release to the environment.

[Response]

- If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms, get medical attention.
- Get medical attention if you feel unwell.
- If on skin : Wash with plenty of water and soap.
- If skin irritation or rash occurs, get medical attention.
- If exposed or concerned ; Get medical attention.

[Storage]

- Store in a cool, well-ventilated place.
- Keep container tightly closed and store in a cool, well-ventilated place.

[Disposal]

- Please consult us about the possibilities of recycling, treatment or handling.
- Disposal should be in accordance with applicable regional, national and local laws and regulations.

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS No.	TSCA	EINECS	%w/w
Nickel sulfate	10101-97-0	Listed	231-104-9	NiSO ₄ ·6H ₂ O:98.5< Ni:22.0 <

4. FIRST AID MEASURES

Eye contact	Rinse cautiously with plenty of water for several minutes. Get medical attention.
Skin contact	Wash with plenty of water and soap. Take off all contaminated clothing and shoes. Wash contaminated clothing before reuse.
Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately get medical attention. Get medical attention if you feel unwell.
Ingestion	Rinse mouth. Get medical attention.

5. FIRE FIGHTING MEASURES

Flammable properties	
Flash point	No data available

Extinguishing media	
Suitable extinguishing media	This substance is nonflammable. Use adequate extinguishing agents for surrounding fire.
Unsuitable extinguishing media	Use adequate extinguishing agents for surrounding fire.
Protection of firefighters	Wear adequate respiratory protection and chemical-resistant clothing. (heat resistance)
Specific hazards arising from the chemical	In case of fire, irritating or toxic fumes or gases may be generated.
Protective equipment and precautions for firefighters	Move container to safe area, if possible with low risk.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Immediately isolate the spilled area with adequate distance for all directions. Wear adequate protector refer to Section 8 and avoid contact with eyes and skin or inhaling. Keep unnecessary and unprotected personnel from entering.
Environmental precautions	Avoid entering the river or affecting to the environment. Do not let this substance enter the environment.
Method for clean-up	Sweep diffused spillage and place in an empty container. Residual substances are collected completely with care and moved to a safe place. Sweep up spillage and place in a sealable empty container for later disposal. Treat with solution of calcium hydrate or sodium carbonate, and then wash plenty of water. Prevent the spillage release to the river.

7. HANDLING AND STORAGE

Handling	Wear protective equipment and set the engineering controls refer to Section 8. Local exhaust or general ventilation may be necessary. (Refer to Section 8) Wear protective gloves when handling. Use only outdoors or in a well-ventilated area. Avoid breathing dust or fume. Wash hands thoroughly after handling. Avoid to contact with strong oxidizers. (refer to Section 10)
Storage	Keep away from high temperature, humidity and direct sun light. Keep container tightly closed and store in a cool, well-ventilated place. Store keeping away from incompatible materials.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure guidelines	ACGIH has established the following exposure limit. <ACGIH> 0.1mg/m ³ (TWA)(as Ni, Soluble inorganic compounds (NOS))(2007) <JSOH> Not established (2007) . <OSHA> 1mg/m ³ (PEL-TWA) (as Ni)
Engineering controls	Indoor use, seal the source or provide local exhaust. In case of dust or fume may generate, use local ventilation.
Personal protective equipments	
Respiratory protection	Wear respiratory protection.
Skin protection	Wear protective gloves.
Eye / face protection	Wear eye protection. (e.g. A pair of goggles) Wear protective clothing or face protection if necessary.
General hygiene considerations	Do not eat, drink, or smoke during work. Wash hands thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Crystal
Color	Pale blue green
Odor	Odorless
Melting point	No data available (Decomposed to nickel oxide and sulfur trioxide at 840°C)
Boiling point	No data available.
Flash point	No data available.
Explosive range	No data available.
Vapor pressure	No data available.
Vapor density	No data available.
Specific gravity	2.07
Solubility in water	Water 40.8g/100g (25°C Anhydrous salts)
Partition Coefficient: n-octanol/water	No data available.
Auto-ignition point	No data available.
Decomposition temperature	No data available.
Odor threshold	No data available.
Evaporation rate	No data available.
Flammability (solid, gas)	No data available.
Viscosity	No data available.

10. STABILITY AND REACTIVITY

Chemical stability	Stable under normal condition.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizers.
Hazardous decomposition products	In case of fire, irritating or toxic fumes or gases may be generated.
Possibility of hazardous reactions	React with base and form hydroxides. Upon heating, decompose at 848 °C and generate hazardous fumes of sulfur trioxide or Nickel oxide. The solution is a weak acid.

11. TOXICOLOGICAL INFORMATION

Acute toxicity – oral	LD ₅₀ 275~500 mg/kg (rat) Category 4 would be suitable based on ECETOC TR33.
Acute toxicity – dermal	No data available
Acute toxicity–inhalation	No data available
Skin corrosion/irritation	Skin irritation: Negative (rabbits)
Serious eye damage/eye irritation	Eye irritation: Negative (rabbits)
Respiratory sensitization	Respiratory sensitizer. As nickel compounds including this substance are listed as respiratory sensitization substances by DFG and listed as Group 2 by the Japan Society of Occupational Health.
Skin sensitization	Skin sensitizer. (guinea pig; maximization study) As nickel compounds including this substance are listed as skin sensitization substances by DFG and listed as Group 1 by the Japan Society of Occupational Health.
Germ cell mutagenicity	Germ cell in vivo mutagenicity study of Cytogenetic test and somatic cell in vivo mutagenicity study of Micronuclei test and Cytogenetic Test; Negative.
Carcinogenicity	As nickel compound : IARC : Group 1 (Carcinogenic to humans)(1990) ACGIH : A1(Confirmed Human Carcinogen)(2001) NTP : K(Known to be a Human Carcinogen)(2005)

Reproductive toxicity	Effects on male fertility and development of pups are observed.
Specific target organ toxicity (single exposure)	Acute symptoms, such as nausea, an abdominal spasm, diarrhea, vomiting, headache, giddiness, a sense of exhaustion, muscular pain or single-sided visual field defect were observed. In addition, as acute intoxication of a nickel compound, nausea, diarrhea, giddiness, and headache were seen in human.
Specific target organ toxicity (repeated exposure)	<p>The increase of protein, β2-microglobulin, retinol binding protein or NAG concentration in urine was observed in human. Also Chronic allergic rhinitis, nasal-septum erosion, perforation and ulcer were observed in human.</p> <p>Degeneration and atrophy of olfactory epithelium, alveolitis, atrophy of vas deferens, vacuolation or degeneration of liver cell, glomerular degeneration in kidney, decudation of alveolar and bronchial epithelium and thickening of alveolar cell wall in lung, emphysema were observed in animal experiments.</p> <p>The target organs are respiratory system, kidney, testis and liver.</p> <p>Repeated exposure of nickel or nickel compounds may damage the membrane of respiratory system at the established level. Prolonged exposure at high concentration may cause pulmonary fibrosis.</p>
Aspiration hazard	No data available.

12. ECOLOGICAL INFORMATION

Hazardous to the aquatic environment – acute toxicity – EC₅₀ (72h) 0.75 mg/l (Senastrum)

An estimate of the molecular weight conversion from anhydride to hexahydrate
EC₅₀ (72h) 1.27 mg/l (Category 2)

Hazardous to the aquatic environment – chronic toxicity – No data available.

This substance is metal. No data is available about the behavior in the water.
Toxic to aquatic life through chronic influence (Category 2)

13. DISPOSAL CONSIDERATIONS

- Please consult us in case of recycling.
- Disposal should be in accordance with applicable regional, national and local laws and

regulations.

- When order to dispose the remainder to the private or public waste disposer, inform the physico-chemical and health hazards of this substance.
- Container should be cleaned up prior to recycling or dispose in accordance with applicable regional, national and local standard method.
- Empty container should be cleaned up prior to disposal.

14. TRANSPORT INFORMATION (not meant to be all-inclusive)

Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
UN Number	3077
Class	9
Sub Risk	-
Packing Group	III

15. REGULATORY INFORMATION (not meant to be all-inclusive)

TSCA Inventory	Listed
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This product is followed by the competent regulations in an applicable country or region.

16. OTHER INFORMATION

Reference

- 1 European Center of Ecotoxicology and Toxicology of Chemicals(ECETOC) ; Technical Report No. 33 (1989)
- 2 WHO/IPCS : Environmental Health Criteria (EHC) No.108 (1991)
- 3 JSOH ; Recommendation of Occupational Exposure Limits. J. Occup. Health. (2005) <Japanese>
- 4 IARC ; IARC Monographs on the Evaluation of Carcinogenic Risk to Humans. Vol. 49 (1990)
- 5 USDHHS ; The Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles. (2005)
- 6 US NTP ; NTP Database Search (2005)
- 7 ACGIH ; Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. 7th Ed. (2001)
- 8 CERJ ; Hazard data sheet 97-19(1) (1998) <Japanese>
- 9 "Biodegradation and Bioaccumulation Data of Existing Chemicals based on the CSCL Japan." ed by Chemicals Inspection & Testing Institute Japan (1992)
- 10 "Biodegradation and Bioaccumulation Data of Existing Chemicals based on the CSCL Japan." ed by Chemicals Inspection & Testing Institute Japan (1992)
- 11 GHS Classification of Nickel (Chemical Management Center, National Institute of Technology and Evaluation ; <http://www.safe.nite.go.jp/english/dbi.html> , 2007)
- 12 "2004 Emergency Response Guidebook. 2nd revised ed." Japanese ed. Japan Chemical Industries Association (2005)

This information only concerns the above-mentioned product and does not need to be valid if used with other(s) or in any process. The information is to our best present knowledge correct and complete and is given in good faith but without warranty. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

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