School Material Safety Data Sheet

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NICKEL SULFATE
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SECTION 1. INTRODUCTORY INFORMATION

MATERIAL NAME AND FORMULA: NICKEL SULFATE, $NiSO_4 \cdot 6(H_2O)$
SYNONYMS: Nickelous Sulfate Hexahydrate; Sulfuric Acid, Nickel Salt, Hexahydrate
CAS NUMBER: 10101-97-0
INGREDIENTS: Nickel (II) Sulfate Hexahydrate, ca 99%
DOT CLASSIFICATION: ORM-E (NA 9141)
EPA CLASSIFICATION: Hazardous substance; Priority toxic pollutant; Hazardous waste constituent.
MANUFACTURERS: Always request Material Safety Data Sheets from your chemical supplier. These should indicate the manufacturer of the substance and include an emergency phone number to call. The Manufacturers section of this book contains a listing of some of the larger manufacturers and available emergency numbers.

NFPA FIRE HAZARD SYMBOL
(See Glossary for details)

DESCRIPTION: Blue to blue green tetragonal crystals with no odor. At 127.94°F (53.3°C), transition to green crystals occurs.

PRELIMINARY INFORMATION: Nickel (II) sulfate is an irritating and harmful substance when swallowed. Inhalation of dusts or mists may be dangerous. There is a possible carcinogenic risk especially involving "airborne nickel" (see sect. 4). This nonflammable chemical is often found in chemistry labs.

SECTION 2. USE AND STORAGE INFORMATION

-- PRELIMINARY PLANNING CONSIDERATIONS --

- Safety glasses or goggles and protective clothing (rubberized apron, etc.) should be worn for all experiments.
- Be sure eyewash station and safety shower are in good working order and readily available.
- Always provide for safe disposal of all chemical waste generated in the lab. Check applicable regulations prior to use.
- Due to possible carcinogenic risk, extra precautions should be taken to avoid intake of dust or mist through inhalation.
- Provide adequate ventilation.

-- USAGE PRECAUTIONS AND PROCEDURES --

- READ THE LABEL and follow all precautions.
- Maintain good housekeeping practices to avoid unintentional mixing with incompatible materials. Clean up spills promptly.
- For safety, contact lenses should not be worn in the laboratory; soft lenses may absorb irritants and all lenses may concentrate them. Particles can also adhere to contact lenses and cause corneal damage.
- Avoid creating airborne dust conditions.
- After working with this material, always wash hands and face before eating, drinking, or smoking.
- Undergoes thermal decomposition (see sect. 6).
- Do not breathe dust or mist. Prevent eye contact with this material.
- Wash contaminated skin promptly. Remove contaminated clothing and launder before reuse.
- Do not eat or smoke in areas where this material is handled.
- Wear rubber gloves as needed to avoid repeated or prolonged contact.

-- ADDITIONAL INFORMATION --

- Nickel sulfate does not polymerize. This material is stable at room temperature under normal conditions.
- A water solution of this material is acidic.

-- PREFERRED STORAGE LOCATION AND METHODS --

- Storage area should be cool and well ventilated. Containers should be tightly closed.
- Do not store chemicals alphabetically by name; store by chemical family instead to keep compatibles together.
- All chemical containers should be protected from physical damage and kept out of direct sunlight.
- Smoking should not be permitted in areas where chemicals are stored.
- Purchase only amounts equivalent to one year's needs.
- Store with compatible materials on sturdy shelving.

SECTION 3. SPILLS AND DISPOSAL PROCEDURES

IF MATERIAL IS SPILLED:

- Ventilate area of spill.
- Cleanup personnel should have protection against inhalation of dust or mist and skin or eye contact.
- For liquid (solution) spills, cover material with an inert solid absorbent (vermiculite, dry sand, etc.) and scoop into an appropriate container (with secure lid) for disposal in accordance with existing regulations. Dike with inert absorbent material, as needed, to contain and limit spill area.
- Sweep, vacuum, or scoop up spilled solid, avoiding generation of dust. Place in a suitable container (with secure lid) for later disposal.

DISPOSAL OF SMALL QUANTITIES:

- Contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.
- Disposal may require precipitating Ni under alkaline conditions, filtering and neutralizing the filtrate for discharge, and placing the nickel-containing sludge in an approved secured landfill.

DISPOSAL OF LARGER AMOUNTS: Contact a licensed disposal company.

FOLLOW ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS FOR ALL WASTE DISPOSAL

MATERIAL NAME: NICKEL SULFATE SHEET NO: 138

SECTION 4: HEALTH HAZARDS

Current OSHA PEL TLV; 8-hr. TWA: 1.0 mg/m^3 (as Ni)
ACGIH TLV: 0.1 mg/m^3

- In a 1977 criteria document, NIOSH recommended a 10-hr. TWA of 0.015 mg/m^3 (as Ni).

- Dog, Subcutaneous, LDLo: 500 mg/kg
- Dog, Intravenous, LDLo: 72 mg/kg

- Persons with sensitivity to nickel compounds should avoid contact (see below).
- Inhalation of dust or mist is irritating to the upper respiratory tract. Due to the possible carcinogenic danger from airborne nickel (see below), any inhalation of dusts or mists should be avoided.
- Irritating to the skin; may produce allergic sensitization. "Nickel itch" is a form of dermatitis characterized by itching, erythema, and skin eruptions that can occur in those handling nickel compounds.
- Eye contact with dust or solutions may cause irritation.
- Ingestion of nickel salts can cause giddiness, nausea, and vomiting.
- The IARC and NTP list "nickel and certain nickel compounds" as suspected carcinogens. This is based in part on epidemiological evidence of excess incidences of nasal and lung cancer in populations of workers exposed to nickel or nickel compounds. The specific nickel compounds responsible have not been identified.

SECTION 5: FIRST AID PROCEDURES

Eye contact:
- Flush eyes promptly with plenty of running water for at least 15 minutes, including under the eyelids.
- Get prompt medical attention.*

Skin contact:
- Flush affected area with large amounts of water, then wash exposed areas of skin with soap and water. Avoid further contact.
- Get medical attention if irritation persists.*

Inhalation:
- Remove victim to fresh air.
- Get medical help for coughing or breathing difficulty.

Ingestion:
- Give victim several glasses of water or milk to drink. Contact medical personnel or poison control center for instructions.
- Never give anything by mouth to a person who is unconscious or convulsing.

* Get medical help (in school, paramedic, or community) for further treatment, observation, and support after first aid.

SECTION 6: FIRE PROCEDURES AND DATA

- Material is nonflammable.
- No unusual fire or explosion hazards are associated with this material.
- Extinguishing media: Use media appropriate to surrounding fire conditions. Minimize water runoff to sewers or waterways if water is used.
- For fires involving a number of chemicals, fire fighters should wear appropriate protective clothing and use respiratory protection. Self-contained breathing apparatus is recommended.
- A water spray may be used to cool fire-exposed containers and disperse vapors.

THERMAL DECOMPOSITION PRODUCTS: Undergoes dehydration upon heating; loses $5H_2O$ @ approx. 98.6°F (100°C); and decomposes at approx. 1558°F (848°C), with evolution of toxic oxides of sulfur.

FLASH POINT AND METHOD(S) ... Not Flammable

AUTOIGNITION TEMPERATURE ... Not Flammable

FLAMMABILITY LIMITS IN AIR (vol. %) : Not Flammable **Lower ...** -- **Upper ...** --

SECTION 7: PHYSICAL DATA

VAPOR PRESSURE (@ 20°C, mm Hg) ... Negligible
SOLUBILITY IN WATER (@ 0°C) ... 62.5 g/100cc;
(@ 100°C ... 340.7 g/100cc)
pH OF AQUEOUS SOLUTION (5%) ... 3.0 - 5.0
SPECIFIC GRAVITY ... 2.07 g/cc

FORMULA WEIGHT ... 262.86
MELTING POINT ... 127.9°F (53.3°C) Transition Point
212°F (100°C) Dehydrate
1558.4°F (848°C) Decomposes

DATA SOURCES: Genium's Industrial MSDS #37 (2/86) and references 2, 4, 5, 9, 12, 14, 19, 27, 58, 61, 62, 82, 84, 501, 509.
(see glossary for titles)

Approvals: Author J. Banta
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