

School Material Safety Data Sheet

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855



No. 62

MERCURY (II) NITRATE

February 1987

SECTION 1. INTRODUCTORY INFORMATION

MATERIAL NAME AND FORMULA: MERCURY (II) NITRATE; $\text{Hg}(\text{NO}_3)_2$
SYNONYMS: Mercuric Nitrate; Nitric Acid, Mercury (II) Salt; Mercury Pernitrate
CAS NUMBER: 10045-94-0
INGREDIENTS: Mercuric Nitrate, >99%
DOT CLASSIFICATION: Oxidizer
EPA CLASSIFICATION: Hazardous Waste, Hazardous Substance.



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.

DESCRIPTION: White or yellowish deliquescent crystals or powder with no odor.

PRELIMINARY INFORMATION: Mercuric nitrate is a highly toxic (can be fatal) compound. As an oxidizer, it is a dangerous fire risk in contact with organic materials. Explosive products can also be formed from certain reactions (see sect. 2). Most common area of use would be in the chemistry lab. This material is **NOT RECOMMENDED** for use in schools unless educational objectives cannot be met in other ways. If the substance is deemed necessary, use with great caution and take all appropriate safety measures.

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.
- The following information is provided even though this material is **NOT RECOMMENDED** for use in schools.
- Whenever possible, substitute less hazardous materials.
- Review sections 3, 5, and 6 to prepare for possible accidents or emergencies.
- Rubber gloves are recommended when working with this material.
- Students should be aware of safe handling procedures for use of this material. Be sure they also understand the hazards involved.
- Provide good ventilation to reduce inhalation dangers.

-- USAGE PRECAUTIONS AND PROCEDURES --

- **READ THE LABEL** and follow all precautions.
- Maintain good housekeeping practices to avoid unintentional mixing with incompatible materials and accumulation of dust. 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.
- After working with this material, always wash hands and face before eating, drinking, or smoking.
- Avoid creating airborne dust conditions. Do not ingest!
- Avoid skin contact; prevent eye contact with dust or mist. Keep this material off your clothing and belongings.

-- ADDITIONAL INFORMATION --

- Material does not polymerize. This material is stable at room temperature under normal conditions.
- Incompatible with petroleum, hydrocarbons, and, as an oxidizer, reducing agents and flammable and combustible materials.
- Contact of aqueous solutions with acetylene, ethanol, or phosphine can result in the formation of explosive products that are sensitive to heat, friction, and/or impact.
- It is violently reduced to mercury by phosphinic acid (hypophosphorus acid).

-- 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, if at all.
- Store on sturdy shelving, or in a locked POISONS cabinet.
- Not recommended for use or storage in schools without an absolute need being determined.

SECTION 3. SPILLS AND DISPOSAL PROCEDURES

IF MATERIAL IS SPILLED:

- Ventilate area of spill. Do not allow release of mercuric nitrate into drains or waterways.
- Cleanup personnel should wear personal protective equipment as necessary to prevent skin or eye contact and inhalation of dust.
- 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.
- Wash spill area after cleanup with dilute calcium sulfide solution.

DISPOSAL OF SMALL QUANTITIES:

- Contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.
- Reclaim when possible; unsalvageable material requires disposal as a hazardous waste.
- Do not allow release of solutions without prior treatment (such as precipitation as the sulfide) to remove mercury to allowable levels.

DISPOSAL OF LARGER AMOUNTS: Contact a licensed disposal company.

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

SECTION 4: HEALTH HAZARDS

Mercuric nitrate has not been identified as a known or suspected carcinogen by the NTP, IARC, or OSHA.

Current ACGIH TLV: 8-hr. TWA: 0.1 mg/m³ as Hg

Current OSHA PEL for "mercury" is 0.1 mg/m³ as a ceiling concentration.

- In its 1973 Criteria Document on inorganic mercury, NIOSH recommended a PEL of 0.05 mg/m³ as an 8-hr. TWA for all inorganic mercury compounds.

- Oral, Rat, LD₅₀: 51.4 mg/kg.
- Oral, Mouse, LD₅₀: 29.1 mg/kg

- Mercuric nitrate is toxic by inhalation and ingestion. Mercuric salts are also absorbed through the skin.
- Overexposure because of acute inhalation can irritate the mucous membrane of the respiratory tract and cause abdominal pain, vomiting, diarrhea, and inflammation of the gums (gingivitis) and mouth (stomatitis). Symptoms of chronic toxicity include psychic and emotional disturbances (excitability, anxiety, depression, indecision, insomnia), nervous system effects (muscular tremors, incoordination), gingivitis, stomatitis, and kidney damage.
- Ingestion can severely irritate the GI tract and cause difficulty in swallowing, nausea, vomiting, abdominal pain, diarrhea, shock, and death.
- Skin and eye contact can cause irritation.

NOTE: The term "mad as a hatter" is widely thought to be based upon hat makers being poisoned by the mercury compounds they worked with in making felt hats. "Mad as a hatter" has other derivations. See *Mercury, A History of Quicksilver* by Leonard J. Goldwater, York Press, Baltimore, MD; pp 273-275.

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:

- Remove contaminated clothing promptly.
- Wash exposed areas of skin with soap and water.
- Get medical attention if irritation or other symptoms develop.*

Inhalation:

- Remove victim to fresh air; restore and/or support breathing as necessary.
- Get prompt medical attention.*

Ingestion:

- Get immediate medical attention.*
- Give several glasses of water to drink. Induce vomiting – but ONLY if victim is conscious and alert. Repeat. Keep victim warm and at rest.
- 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

- Mercuric nitrate is an oxidizer and can promote and accelerate combustion. Flood fires with water (if water is a suitable extinguisher for the burning materials).
- Toxic chemical; prevent runoff to sewer or waterway.
- Toxic fumes may be evolved under fire conditions (see below).
- Extinguishing media: Use media appropriate to surrounding fire conditions.
- For major fires, or if large quantities of this material are involved, 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: Mercury oxide and oxides of nitrogen. (Thermal decomposition of mercury oxide also yields toxic mercury vapor and oxygen).

FLASH POINT AND METHOD(S) ... Noncombustible

AUTOIGNITION TEMPERATURE ... Noncombustible

FLAMMABILITY LIMITS IN AIR (vol. %) : Noncombustible

SECTION 7: PHYSICAL DATA

BOILING POINT (@ 1 atm) ... Decomposes

SOLUBILITY IN WATER ... Soluble

SPECIFIC GRAVITY ... 4.3

MELTING POINT ... 174.2°F (79°C)

FORMULA WEIGHT ... 333.61 [324.66 for Hg(NO₃)₂]

NOTE: Physical data refers to the properties of hemihydrated mercuric nitrate, Hg(NO₃)₂•1/2 H₂O

DATA SOURCES: Genium's Industrial MSDS #169 (1/86) and references 2, 4-7, 12, 14, 19, 25, 43, 44, 49, 55, 56, 58, 60-62, 82, 84, 501, 506, 509-11.
(see glossary for titles)

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Author

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