

Identification

Product Name: Nickel Bromide Solution
Other Names: Nickel (II) Bromide, Nickelic Bromide, NB
Recommended use and restrictions on use: Component in electroplating solutions
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Composition/Information on Ingredients

Component	CAS Number	% Content
Nickel Bromide Trihydrate	7789-49-3	21 – 23
Water	7732-18-5	81-83

First Aid Measures

- Eye:** Eye irritation. Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing.
- Skin:** Wash affected area with soap and water for at least 15 minutes, especially under fingernails and around cuticles. Remove clothing and shoes that came in contact. Wash contaminated clothing before reuse. Thoroughly clean shoes before reuse.
- Inhalation:** If affected, remove individual to fresh air. If breathing is difficult, administer oxygen. Avoid mouth-to-mouth resuscitation.
- Ingestion:** If conscious, induce vomiting and clear mouth and nose. Get medical attention.

In all cases be prepared to treat for shock.

Fire Fighting Measures

Suitable Extinguishing Media: In all cases this material does not support combustion. Water, water fog, and/or carbon dioxide (CO₂) may be used to cool fire-exposed storage containers, structures and to protect personnel.

Fire Fighting Procedures: Do not flush down sewers or other drainage systems. Material is harmful to aquatic life.

Unusual Fire and Explosion Hazards: None. Material is denser than water and will mix completely into excess water when allowed to do so.

Combustion Products: Extremely high temperatures may remove water by evaporation and lead to thermal decomposition releasing nickel oxide and bromine.

Accidental Release Measures

Keep unnecessary and/or untrained people away. Isolate spill area and avoid tracking through liquid. Dike and prevent runoff to drains or sewers. For small spills, cover with lime and then scoop into polyethylene drums for later disposal. Large spill may be pumped directly into a storage container for later disposal. Do not wash residue to drain or sewer. Refer to Section 15 for spill/release reporting information.

Handling and Storage

Handling Do not get in eyes, on skin, or on clothing. Do not breathe mists. Keep containers closed when not being used. Use only with adequate ventilation. Use good personal hygiene practices. After handling wash hands before eating, drinking, or smoking. Remove contaminated clothing and protective equipment before entering eating areas. Remove contaminated clothing and clean before reuse.

Storage Store in tightly closed containers in a well-ventilated area. Protect from physical damage.

Empty containers may contain hazardous residue.

Exposure Controls/Personal Protection

Exposure Limits

Component

Nickel Bromide –	Inhalation as soluble Nickel
	OSHA ^a PEL: 1.0 mg/m ³
	ACGIH ^b TLV: 0.1 mg/m ³

Engineering Controls: Local exhaust ventilation may be necessary to control air contaminants to their exposure limits. The use of local ventilation is recommended to control emissions near the source. Provide mechanical ventilation for confined spaces.

Personal Protective Equipment (PPE)

Eye Protection: Wear chemical safety goggles or face shield. Have eye-wash stations available where eye contact can occur.

Skin Protection: Avoid skin contact. Wear rubber or neoprene gloves that are impervious to conditions of use.

Respiratory Protection: Under mist free conditions no respiratory protection should be worn. Should TWA limits be exceeded a NIOSH approved respirator for mist is generally acceptable for concentrations up to 100 times the PEL. Respiratory protection must be provided in accordance with OSHA 29 CFR 1910.134.

Physical and Chemical Properties

Room Temperature Appearance: Bright green liquid

Odor: None

pH: 2.0 – 4.0

Flashpoint: Not applicable

Autoignition Temperature: Not applicable

Upper/lower Flammability Limits: Not applicable

Danger of explosion: Not applicable

Boiling Point: As water

Melting Point: 963°C as NiBr_2 – Solution crystallizes below 22°F (-5°C)

Vapor Pressure: As water

Evaporation rate: As water

Vapor Density: As water

Solubility: All proportions

Specific Gravity: 1.18 – 1.20 @ 20°C

Molecular Formula: $\text{NiBr}_2 \cdot 3\text{H}_2\text{O}$

Molecular Weight: 272.57

Stability and Reactivity

Stability/Incompatibility: Under typical storage conditions this material is stable indefinitely. When heated and open to the air this material will lose solution water, become concentrated, and begin to crystallize. If the Nickel Bromide solution is allowed to evaporate to dryness and the solid heated above 300°C the residue will lose waters of hydration. If heated sufficiently high it will become anhydrous nickel bromide.

Hazardous Reactions/Decomposition Products: Heating anhydrous nickel bromide to high temperatures may generate nickel oxide and bromine.

Toxicological Information

Signs and Symptoms of Overexposure: Eye and nasal irritation, dermatitis with itching

Acute Effects:

Eye Contact: Cause irritation

Skin Contact: Not absorbed through skin. May cause dermatitis or allergic skin reactions.

Inhalation: Inhalation of mist can cause upper respiratory tract irritation.

Ingestion: Can cause gastrointestinal disorders.

Carcinogenicity: Nickel compounds are listed by IARC^c as Group 1: carcinogenic to humans. Nickel compounds are listed by NTP^d as known human carcinogens. Not listed as a carcinogen by OSHA or ACGIH.

Acute Toxicity Values: Toxicological studies have not been performed on nickel bromide. Using nickel chloride as a related compound, the calculated value^e nickel bromide for Rats (male) LD₅₀ = 672 mg/kg.

Ecological Information

When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater. When released into water, this material is not expected to biodegrade. When released into water, this material is not expected to evaporate significantly. This material does not bioaccumulate.

Disposal Considerations

In case of a spill the nickel can be made insoluble by covering with lime or soda ash (sodium carbonate). The resulting solid material can be stored for recovery in a polyethylene drum.

Do not wash residue to a drain or sewer.

Empty storage containers may be rinsed clean of product residues with clean water and the solution then treated with lime or soda ash for recovery of solid nickel carbonate/hydroxide residue. Store residue in a polyethylene drum.

After treatment with lime or soda ash, the residue is to be labeled as EPA Hazardous Waste Number F006.

Transport Information

U.S. Department of Transportation (DOT)**Proper Shipping Name:**

Environmentally hazardous substance liquid N.O.S. (Nickel Bromide)

Hazard Class: 9**UN/NA Number:** UN 3082**Packing Group:** III**Labels Required:** 9**International Maritime Organization (IMDG)****Proper Shipping Name:**

Environmentally hazardous substance liquid N.O.S. (Nickel Bromide)

Hazard Class: 9**UN/NA Number:** UN 3082**Packing Group:** III**Labels Required:** Marine Pollutant

Regulatory Information

GHS Classification:**Health**

Eye Irritation	Category 2B
Respiratory Sensitizer	Category 1
Skin Sensitizer	Category 1
Carcinogenicity	Category 2
Acute Toxicity	Category 4

Environmental

Aquatic Toxicity - Acute	Category 1
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**Label content:**

Warning



Danger



Marine Pollutant

Hazard Statements

- Danger – May cause allergic or breathing difficulties if inhaled
- Warning – Harmful if swallowed (oral)
- Warning – Harmful if inhaled
- Warning – Very toxic to aquatic life
- Warning – May cause allergic skin reaction

Precautionary Statements

Do not breathe mist/vapors

Wear respiratory protection, protective gloves, and eye/face protection.

Wash thoroughly after handling.

Comprehensive Environmental Response and Liability Act of 1980 (CERCLA):

100 lb final RQ; 45.4 kg final RQ

Toxic Substances Control Act (TSCA):

Not listed on the TSCA list since it is hydrated

Clean Water Act (CWA): This material (Nickel Compounds) is listed under the CWA with a reportable quantity (RQ) of 100 pounds, 45.4 kg.

Clean Air Act (CAA):

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Superfund Amendments and Reauthorization Act (SARA) Title III Information:

This material is listed under Section 313 as Nickel Compounds.

State Regulations**California:**

Nickel compounds, in general, are listed under Proposition 65 as cancer causing materials.

International Regulations**Canadian Environmental Protection Act:**

CAS# 7789-49-3 is grouped into the category "Nickel, water-soluble inorganic compounds, n.o.s.*" at a concentration of greater than 1% wt/wt.

Canadian Workplace Hazardous Materials Information System (WHMIS):

Not listed

European Inventory of Existing Chemicals (EINECS): Anhydrous Nickel Bromide is included in the ECICS as EC# 236-665-0. At this time it is not clear if the same number is being used for hydrated forms of Nickel Bromide.

EU Classification, Risk (R) and Safety (S):

The following Risk and Safety Classifications have not been authorized by the EU and should be considered as recommendations.

- R20 – Harmful by inhalation
- R22 – Harmful if swallowed
- R42 – May cause sensitization by inhalation
- R43 – May cause sensitization by skin contact
- R50 – Very toxic to aquatic organisms
- R53 – May cause long-term adverse effects in the aquatic environment
- R61 – May cause harm to the unborn child
- S24 – Avoid contact with skin
- S25 – Avoid contact with eyes
- S29 – Do not empty into drains
- S36 -- Wear suitable protective clothing
- S37 -- Wear suitable gloves
- S60 – This material and its container must be disposed of as hazardous waste
- S61 – Avoid release to the environment. Refer to special instructions / safety data sheets

Other Information

National Fire Protection Association (NFPA) Ratings: This information is intended solely for the use of individuals trained in the NFPA system.

Health: 2
Flammability: 0
Reactivity: 0

^a OSHA 29 CFR 1910.1000, Table Z-1

^b ACGIH [2003] Nickel Threshold limit values for chemical substances and physical agents and biological exposure indices. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

^c IARC. 1990. IARC monographs on the evaluation of carcinogenic risks to humans. Volume 49: Chromium, nickel and welding. Lyon, France: International Agency for Research on Cancer, World Health Organization, 257-445.

^d NTP. 2002. Report on carcinogens. Bethesda, MD: U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program.
<http://ehp.niehs.nih.gov/roc/toc10/html.June.06>, 2003.

^e FDRL (1983): Acute oral LD50 study in rats. Study N°7684A submitted to NiPERA Food and Drug Research Laboratories. Inc. POB 107, Route 17C, Waverly, N.Y., U.S.A., 14892-0107, 1983.

Key/Legend

TSCA = Toxic Substance Control Act;

ACGIH = American Conference of Governmental Industrial Hygienists;

IARC = International Agency for Research on Cancer;

NIOSH = National Institute for Occupational Safety and Health;

NTP = National Toxicology Program;

OSHA = Occupational Safety and Health Administration

FDRL = Food and Drug Research Laboratories

NFPA = National Fire Protection Association

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