

SAFETY DATA SHEET

Nickel Chloride

Product Information

Zincomond Nickel Chloride

Synonyms : Nickel(II) Chloride ; Nickel Chloride Hexahydrate

Zincomond Nickel Chloride is used for electroplating or electroless plating.

Manufactured by :

ZENITH CHEMICAL CORPORATION

Contact Information : Tel 886-4-26811521 ; FAX 886-4-26816523

Hazards Identification

GHS :

Health	Environmental	Physical
Acute Toxicity (oral) – Category 3	Aquatic Toxicity – Chronic 1	-----
Acute Toxicity (inhalation) – Category 3	-----	-----
Skin Corrosion / Irritant – Category 3	-----	-----
Respiratory Sensitization – Category 1	-----	-----
Skin Sensitization – Category 1	-----	-----
Carcinogenicity – Category 1A	-----	-----
Reproductive toxicity – Category 2	-----	-----
STOT * Repeated Exposure – Category 2	-----	-----

*- Single Organ Target Toxicity

Symbols : Skull and crossbones, Health Hazard, Environment



Signal Word : Danger

Hazard Statements :

H301 Toxic if swallowed.

H316 Causes mild skin irritation.

H317 May cause allergic skin reaction.

H332 Harmful if inhaled.

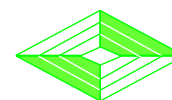
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H350 May cause Cancer.

H361 Suspected of damaging fertility or the unborn child.

H373 May cause damage to organs through prolonged or repeated exposure.

H410 Very toxic to aquatic life with long lasting effects.



Precautionary Statements :

Prevention:

- P201 Obtain special instructions before use.
- P202 Do not Handle until all safety precautions have been read and understood.
- P261 Avoid breathing dust, or fume generated when using this product.
- P264 Wash hands and face thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P271 Use only outdoors or in a well-ventilated area.
- P272 Contaminated work clothing should not be allowed out of the workplace.
- P273 Avoid release to the environment.
- P280 Wear protective waterproof gloves and protective clothing.
- P281 Use personal protective equipment as required.
- P285 In case of inadequate ventilation wear approved respiratory protection.

Response :

See First Aid section below for specific treatment.

- P301+P310 IF SWALLOWED : Immediately call a POISON CENTER or doctor/physician.
- P330 Rinse mouth.
- P304+P340 IF INHALED : Remove to fresh air and keep at rest in a position comfortable for breathing.
- P342+P311 If experiencing respiratory symptoms : Call a POISON CENTER or doctor/physician.
- P302+P352 IF ON SKIN : Wash with plenty of soap and water.
- P333+P313 If skin irritation or rash occurs : Get medical advice/attention.
- P363 Wash contaminated clothing before reuse.
- P308+P313 IF exposed or concerned : Get medical advice/attention.
- P309+P311 Call a POISON CENTER or doctor/physician if you feel unwell.
- P391 Collect spillage.

Storage :

- P403 Store in a well-ventilated place.
- P404 Keep container tightly closed.
- P405 Store locked up.

Disposal :

- P501 Dispose of contents/container in accordance to local, and regional regulations.

Composition

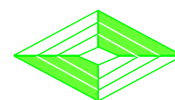
☒ Substance ☐ Mixture

Typical analysis(%) : Ni 24.3%(Min.)

Information on Ingredients : Hazardous ingredients : Nickel Chloride

Typical composition : 99.5%

CAS No. : 7791-20-0



First Aid Measures

Ingestion	Large quantities of water should be drunk. Seek medical attention.
Inhalation	Seek medical attention.
Skin	Wash thoroughly with water. For rashes seek medical advice. Show data sheet if possible.
Eyes	Irrigate eyeball thoroughly with water for at least 10 minutes. If discomfort persists seek medical attention
Wounds	Cleanse thoroughly to remove any nickel chloride particles.

Fire Fighting Measures

Non-flammable. May evolve toxic chlorine containing gases if involved in a fire.
Extinguish surrounding fires with appropriate methods.

Accidental Release Measures

Person related precautionary measures :

Wear waterproof gloves and suitable protective clothing. Avoid generation of dusty atmospheres. Do not inhale dusts. Wear appropriate nationally approved respirators if collection and disposal of spills is likely to cause the concentration limits of airborne nickel to exceed the locally prescribed exposure limits.

Environmental Protection measures :

Do not allow spills to enter watercourses. Dispose of spills in accordance with local regulations.

Procedures for cleaning/absorption :

Collect spills by sweeping or vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if exhaust is discharged into the work place. Nickel-containing material is normally collected to recover nickel values.

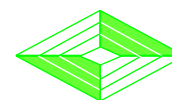
Handling and Storage

Handling :

Prevent the generation of inhalable dusts e.g. by the use of suitable ventilation. Do not inhale dust. Wear appropriate protective clothing, including waterproof gloves and nationally approved respirators. As packed, nickel chloride may constitute a manual handling risk.

Storage :

Keep in the container supplied, and keep container closed when not in use. Local regulations should be followed regarding the storage of this product.



Exposure Controls / Personal Protection

Nickel Chloride Hexahydrate – CAS 37211-05-05		
	Exposure Limit (mg/m3)	Year
ACGIH TLV-TWA ⁽¹⁾	0.1 * ‡ as Ni	2008
UK WEL ⁽²⁾	0.1 as Ni	2006
Japan	1 as Ni	1968
Korea	0.1 as Ni	2006
China	0.5 as Ni	2007

* - as Ni in inhalable fraction

‡ - as Ni in soluble fraction

Maintain airborne nickel levels as low as possible.

Occupational exposure controls :

a. Respiratory protection :

Do not inhale dust. Ventilation is normally required when handling or using this product to keep airborne nickel chloride below the nationally authorized limits. If ventilation alone cannot control exposure, use respirators nationally approved for the purpose.

b. Eye protection:

Avoid eye contact. Wear goggles or face shield.

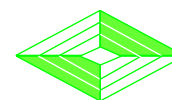
c. Hand & Skin Protection:

Avoid skin contact. Wear suitable protective clothing and waterproof gloves. Wash skin thoroughly after handling and before eating, drinking or smoking. Launder clothing and gloves as needed.

Physical and Chemical Properties

Green /white crystal. Slight acidic odor if wet.

Ingredient	Mol. Wt.
NiCl ₂ ·6H ₂ O	237.7



pH (40g/100ml water solution)	4~6
Boiling point/ boiling range	N/A
Freezing point / freezing range	N/A
Flash Point	N/A
Evaporation rate	N/A
Flammability	N/A
Explosive properties	N/A
Vapour pressure	N/A
Vapour density	N/A
Bulk density	0.9 g/cm ³
Solubility cold water	> 250 g/l
Solubility hot water	> 550 g/l
Partition coefficient	N/A
Auto-ignition temperature	N/A
Decomposition temperature	Decomposes on heating Anhydrous salt sublimates at 450°C
Oxidizing properties	Not oxidizing
Viscosity	N/A
Particle size	N/A

Stability and Reactivity

Conditions to be avoided : Unreactive. Can liquefy at temperature $> \sim 40^{\circ}\text{C}$.

Substances to be avoided : None.

Hazardous decomposition products : At high temperatures toxic chlorine containing gases may be evolved.

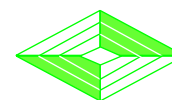
Toxicological Information

Nickel Chloride

Inhalation :

The International Agency for Research on Cancer (IARC) in 1990 and the U.S. Tenth Report on Carcinogens in 2002 concluded that there was sufficient evidence that nickel compounds are carcinogenic to humans. In 1999 Toxicology Excellence for Risk Assessment (TERA) found that carcinogenic risk from soluble nickel compounds via inhalation could not be determined because the existing evidence was composed of conflicting data.

Epidemiological studies of Norwegian nickel refinery workers showed that an increased risk of respiratory cancer was present in electrolysis plant workers. These workers had mixed exposure to aerosols of nickel sulphate and nickel chloride and to insoluble forms of nickel. Electrolysis plant workers in an Ontario refinery similarly exposed to nickel sulphate and nickel chloride aerosols, but not the dust from matte roasting operations,



did not show any increased incidence of respiratory cancer.

There is no evidence from animal studies that nickel compounds are carcinogenic by relevant routes of exposure.

Exposure to aerosols of nickel chloride causes irritation of the upper respiratory tract and may cause asthma.

Skin Contact :

Prolonged and intimate contact with aerosols and solutions of nickel chloride can cause skin irritation, nickel sensitivity and allergic skin rashes.

Eye Contact :

May cause irritation.

Ingestion :

Ingestion of relatively large doses of solutions of nickel chloride may cause nausea, vomiting and diarrhea. The U.S. Food and Drug Administration has affirmed that nickel is generally recognized as safe (GRAS) as a direct human food ingredient. The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded that there is no evidence that nickel and its inorganic compounds are carcinogenic by route of ingestion.

Preexisting Conditions :

Skin contact can cause an allergic rash and/or asthma in previously sensitized individuals.

Reproductive Toxicity :

Animal experiments indicate that soluble nickel ingestion causes adverse effects on fetal development at a threshold oral exposure of 2.2 mg/ Ni/kg/day by pregnant rats. Data are insufficient to determine if this effect occurs in humans and no regulatory agency has classified soluble forms of nickel as reproductive risks for humans.

Ecological Information

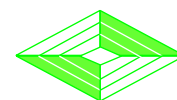
After ecotoxicity testing, Nickel chloride is classified as very toxic. It requires labeling with the Environment pictogram. Labels must carry the risk phrase Toxic to aquatic life.

Disposal Information

Nickel containing material is normally collected to recover nickel values. Should disposal be deemed necessary follow local regulations. Take special note of the ecological classification.

Transport Information

Classified as dangerous goods for all modes of transport.



International Maritime Dangerous Goods Code	Proper Shipping Name(for transport documentation): UN 3288, TOXIC SOLID, INORGANIC, N.O.S. (Nickel Chloride), Class 6.1, P.G. III, MARINE POLLUTANT
International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air	Proper Shipping Name(for transport documentation): UN 3288, TOXIC SOLID, INORGANIC, N.O.S. (Nickel Chloride), Class 6.1, P.G.III.
U.S. Dept. of Transportation Regulations	Proper Shipping Name(for transport documentation): UN 3288, TOXIC SOLID, INORGANIC, N.O.S. (Nickel Chloride), Class 6.1, P.G.III.
Canadian Transportation of Dangerous Goods Act	Proper Shipping Name(for transport documentation): UN 3288, TOXIC SOLID, INORGANIC, N.O.S. (Nickel Chloride), Class 6.1, P.G. III, MARINE POLLUTANT
European Agreement Concerning the International Carriage of Dangerous Goods by Road	Regulated. Drivers are required to carry Travel Emergency (TREM) Card. Proper Shipping Name(for transport documentation): UN 3288, TOXIC SOLID, INORGANIC, N.O.S. (Nickel Chloride), Class 6.1, PGIII.

Regulatory Information

In Europe, Nickel chloride is subject to the Control of Major Accident Hazards Directives 82/501/EEC, 96/82/EC & 98/433/EC (The Seveso Directive). Local consent needs to be obtained to store quantities in excess of 200 tonne.

Other Information

Note:

Zenith Chemical Corporation believes that the information in this Material Safety Data Sheet is accurate. However, Zenith Chemical Corporation makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.

- 1). Threshold Limit Values of the American Conference of Governmental Industrial Hygienists. 2008.
- 2). Maximum Exposure Limit of the Health and Safety Executive in the U.K. in EH40/00.
- 3). Describes possible health hazards of the product supplied. If user operations change it to other chemical forms, whether as end products, intermediates or fugitive emissions, the possible health hazards of such forms must be determined by the user.

Safety Data Sheet prepared by :

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Product Stewardship : 886-4-26811521

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