

	MATERIAL SAFETY DATA SHEET (in compliance with EU Directive 2001/58/EC)
Date : April 1992 Revision 3: January 2008	CRYSTALLIZED NICKEL CHLORIDE

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1. Identification of the substance

- Commercial name: crystallized nickel chloride SELNIC®
- Formula: NiCl₂ · 6H₂O
- Chemical name: Nickel chloride hexahydrate

1.2. Use of crystallized nickel chloride

The main applications are nickel-plating and the chemical processing.

1.3. Manufactured by

ERAMET
Tour Maine-Montparnasse
33, avenue du Maine
75755 Paris Cedex 15
France
Tel.: + 33 1 45 38 42 46
Fax: + 33 1 45 38 73 48
Email : marcel.vadrot@erametgroup.com

1.4. Emergency telephone numbers

Dial your local Emergency number.

The European Poison Information centres telephone numbers are available on the following website:

http://europa.eu.int/comm/health/ph_threats/Bioterrorisme/chem_guidelines_dir_en.htm#5

Emergency number information:

- in Europe, to contact the Emergency Number, dial 112
- in USA, call the National Poison Control Center Hotline at 1 - 800 - 424 - 9300

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

2. HAZARDS IDENTIFICATION

- An accidental ingestion of nickel chloride (around 1 gram) may cause acute intoxication resulting in nausea, vomiting, diarrhoea, and dizziness.

LD50 (orally) for rats is 105 mg/kg (expressed in nickel).

- An excessive exposure to nickel chloride dust may irritate eyes and the respiratory tract, and cause a respiratory sensitisation. A contact with skin may cause skin sensitisation and irritation dermatitis or allergic dermatitis among individuals already sensitised to nickel. These reactions may be accentuated by heat and humidity.
- In terms of the environment, this product is very toxic to certain aquatic organisms.
- See also sections 11 & 12.

3. COMPOSITION – INFORMATION ON INGREDIENTS

3.1. Composition

Name: Nickel chloride hexahydrate

Formula: NiCl₂, 6H₂O

Molar mass: 237.69

Classical analysis:

NiCl₂, 6H₂O: > 97 %

No presence of impurity which may be dangerous such as in Directives 88/379/EEC and 67/548/EEC.

Impurities: < 0.01% each

CAS N°: 7791-20-0

EINECS N°: 231-743-0

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

3.2. Information on ingredients

Nickel chloride hexahydrate is classified by manufacturers as « limited evidence of carcinogenic effect (category 3) », « toxic » and « hazardous for the environment » with the following risk phrases:

- R 20: Harmful by inhalation
- R 25: Toxic if swallowed
- R 36/37/38: Irritating to eyes, respiratory system and skin
- R 40: Limited evidence of a carcinogenic effect
- R 42/43: May cause sensitisation by inhalation and skin contact
- R 50: Very toxic to aquatic organisms

With the advice phrases of caution:

- S 22: Do not breathe dust
- S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
- S 36/37: Wear suitable protective clothing and gloves
- S 57: Use appropriate container to avoid environmental contamination

4. FIRST AID MEASURES

INGESTION: in case of accidental ingestion estimated at less than 0.5 g approximately, drink plenty of water. For higher quantities, seek medical attention to have the stomach pumped.

INHALATION: remove to fresh air. In extreme situations, give oxygen and seek medical attention.

SKIN CONTACT: wash thoroughly with water for at least 15 to 20 minutes. In case of beginning of a skin reaction, seek medical attention.

In case of possible wounds, wash it abundantly for 15 to 20 minutes and make sure that any nickel chloride particle has been removed.

CONTACT WITH EYES: irrigate thoroughly with water for at least 20 minutes. Seek medical attention.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

5. FIRE-FIGHTING MEASURES

- Non inflammable.
- In case of fire close by, if the product is heated above 300°C, it may give off gaseous hydrochloric acid, which is a dangerous gas.
Extinguish the near-by fire by using the most suitable method.

6. ACCIDENTAL RELEASE MEASURES

- Individual protection: wear acid resistant gloves. If any operation creates dust, wear a nationally approved respirator.
- Precautions for environmental protection: do not drain off in sewage, surface water, groundwater, or on soil.
- Cleaning up methods:

As much as possible, avoid creating dust.

If the product does not seem to be contaminated, recover it by means of a shovel or a similar tool.

If the product has been contaminated, recover it by means of a shovel or vacuum cleaner in order to recycle it to a certified station for waste treatment. In case of aspiration, the vacuum-cleaner must have an efficient filter, and staff must wear a nationally approved respirator.

If the product has been dissolved in water, use lime or soda ash. Then recover the sludge by use of an inert absorbent.

7. HANDLING AND STORAGE

7.1. Handling

Avoid any direct contact with the product.

Avoid the creation of dust.

Wear gloves, suitable protective clothing and goggles.

In case of exposure to dust or aerosols, wear a nationally approved respirator.

7.2. Storage

In dry conditions, in closed packaging. Check the need for local compliance with weight limits for storage.

The product is delivered in a polypropylene bag.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

8. EXPOSURE CONTROL / PERSONAL PROTECTION

8.1. Exposure limit values

In France, the exposure limit value (average over 8 hours) for nickel soluble compounds is 0.1 mg Ni/Nm³.

This corresponds to a fixed limit value of 0.4 mg/Nm³, expressed in NiCl₂·6H₂O.

8.2. Exposure controls

8.2.1. Occupational exposure control

8.2.1.1. Respiratory protection:

If the process or the technology used creates dust or spray, the equipment includes a ventilator, so that the exposure is as low as reasonably possible, and must be below the nationally recommended limit (in France: 0.1 mg/Nm³ in Ni (soluble compounds) - average over 8 hours).

In case of exposure above this limit value, use respirators approved by the national authorities.

8.2.1.2. Hand protection: wear acid-resistant gloves.

8.2.1.3. Eye protection: wear goggles with lateral protection.

8.2.1.4. Skin protection:

Wear suitable acid-resistant clothing which should be laundered as required. A good personal hygiene is highly recommended.

For further details, see Toxicology File No 68 by the l'Institut National de Recherche et de Sécurité – April 1992 edition.

See also: http://www.ineris.fr/index.php?module=doc&action=getDoc&id_doc_object=183.

8.2.2. Environmental exposure controls

Do not drain off in sewage, natural water or on soil.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information

Appearance: green-yellow solid deliquescent crystals

Odour: no perceptible odour

9.2. Information related to health, safety and environment

pH: 6.1 for an aqueous solution of 25 g/l (Ni) at 25°C (guaranteed higher than 3.5)

Boiling point: not applicable (sublimation at 973°C for the anhydrous nickel chloride)

Flash point: not applicable

Melting point: not applicable

Flammability: non inflammable

Autoflammability: not applicable

Explosive properties: not applicable

Vapour pressure: not applicable

Bulk density (apparent): 1.9

Solubility: in cold water (20°C) about 2500 g per litre of water
in warm water (95°C) about 6000 g per litre of water

non soluble in usual solvents

Viscosity: not applicable

Vapour density: not applicable

Evaporation rate: not applicable

9.3. Other data

This product has a corrosive effect on metals, due to the presence of chloride.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

10. STABILITY AND REACTIVITY

10.1. Conditions to avoid

- Stable product under normal conditions.
- Do not heat at high temperature (>300°C):
 - emission of gaseous hydrochloric acid, which is a dangerous gas
 - eventual transformation of nickel chloride into nickel monoxide (NiO), which is classified Carcinogenic Category 1, with risk phrases R49, R43.
- May liquefy at temperatures greater than 45°C.

10.2. Materials to avoid

Do not boil after dissolving in sulphuric acid: may form gaseous hydrochloric acid, which is a dangerous gas.

10.3. Hazardous decomposition products

- By reaction with concentrated sulphuric acid at high temperature (>100°C) may form gaseous hydrochloric acid, which is a dangerous gas.
- Decomposition during heating over 300°C:
 - may form gaseous hydrochloric acid, which is a dangerous gas
 - may transform nickel chloride into nickel monoxide (NiO), which is classified Carcinogenic Category 1 with risk phrases R49, R43.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Ingestion of nickel chloride causes nausea, vomiting, dizziness and diarrhoea. There is no report of fatal intoxication in humans. The LD50 (orally) for rats is 105 mg/kg (expressed in nickel, corresponding to 425 mg/kg expressed in NiCl₂·6H₂O). The gastro-intestinal absorption rate of nickel chloride is estimated to be relatively small.

Inhalation of nickel chloride aerosols may cause an irritation of the upper respiratory tract as well as a respiratory sensitisation. Individuals sensitive to nickel may develop asthma, bronchitis or other respiratory difficulties.

Contact with eyes may cause irritation.

Skin contact may cause irritation or an intermediate sensitisation which will give allergic dermatitis after further contacts.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

- **Chronic toxicity**

Inhalation

The International Agency for Research on Cancer (IARC) has considered that there was sufficient evidence to conclude that "nickel compounds" (but not nickel metal) are carcinogens for man, by inhalation [1].

An epidemiological study [2] has revealed an excess of risk related to cancer. There are also relevant and liable epidemiological studies related to exposure including nickel chloride (such as nickel plating) which does not reveal any excess of cancers [3], [4]. There is no animal experimentation data, by inhalation, supporting the hypothesis of a carcinogenic potency for nickel chloride.

The competent EU authority (in the scope of Directive 67/548/EEC) has classified nickel sulphate (but not nickel chloride) as carcinogen Category 3, which corresponds to a "suspicion".

See also Toxicology File INRS No 68 – 1992 edition).

See also: http://www.ineris.fr/index.php?module=doc&action=getDoc&id_doc_object=183.

Ingestion

The National Institute for Occupational Safety and Health (NIOSH) in the USA has concluded that nickel and its inorganic compounds are not carcinogenic for man by oral ingestion.

Mutagenicity / Toxicity for Reproduction

There is some evidence of mutagenic effects in animal experimentation, but for the time being, there is no human data supporting the existence of any of these effects.

Reprotoxicity

There is evidence of reprotoxic effects on rats. Although the available scientific data is not exhaustive, it could cause nickel chloride to be classified in "Reprotoxic Category 2" in the future.

- **Systemic effects**

There are unknown long-term systemic effects which would be caused by an excess of nickel in blood or urine.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Aquatic toxicity

Acute toxicity

Depends mainly on the « hardness » of the water. The results obtained, based on OECD protocol, involve the following classifications:

- Non toxic for fish ($LC_{50} > 100$ mg/L, *Brachydanio rerio*). For most species of fish, the LD50 is 4 - 14 mg Ni/L for soft waters and 22 - 44 mg Ni/L for hard waters.
- Toxic for daphnia (LC_{50} 48h = 6.7 mg/L, *Daphnia magna*)
- Very toxic for algae (LC_{50} 72h = 0.7 mg/L, *Selenastrum capricornium*)

Chronic toxicity

Some data is available.

- NOEC varies from 0.06 to 0.24 mg Ni⁺⁺/L for rainbow trout
- NOEC varies from 0.01 to 0.22 mg Ni⁺⁺/L for *Daphnia magna*

Land toxicity

- Based on available information, nickel chloride should not be classified as ecotoxic for earthworms.
- In acid soils, nickel chloride may be classified as « Toxic » for plants. This toxicity depends on bio-availability of nickel ions, which is generally low in natural soils with a pH higher than 5.5.

Mobility

At present, there is no data, regarding the breakdown of the different environment compartments and adsorption/desorption phenomena.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

12.2. Persistence and degradability

The bio-degradability concept and the associated tests are not applicable to the inorganic substances. This has been confirmed by the conclusions from:

- « Canada/EU Technical Workshop », in 1995
- « OECD's Advisory Group on Harmonization of Classification and Labelling », in 1998
- « NAFTA CEC Task Force on Criteria on the Sound Management of Chemicals », in 1999.

In the case of metals, the bio-availability concept seems more appropriate.

12.3. Bioaccumulation potential

The tests developed to measure bioaccumulation potential (determination of K_{ow} and FBC) do not enable us to forecast the ecotoxic behaviour of nickel chloride because the bioaccumulation mechanisms, for nickel, are different from those in organic substances.

12.4. Other adverse effects

Nickel is an element present in Nature at a significant level. For some scientists, it is also essential for the life of certain organisms.
Nickel chloride is very soluble in water.

- Potential of ozone layer reduction: not applicable
- Potential of photochemical ozone development: not applicable
- Potential of earth heating: not applicable
- Effect on waste-water treatment plants: not significant, if the limit values for rejected liquid effluents are respected.
- The nickel rejected in the liquid effluents is regulated in the UK by local authorities.
In France (Decree of 2nd February 1998 on the installations classed, Article 32):
 - Ni < 0.5 mg/l if the discharge exceeds 5 g/day.
 - Ni < 2 mg/l in the special case of nickel manufacturing or converting installations.
 - Also refer to the prefectorial decree on authorisation of use.

See also section 15.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

13. DISPOSAL CONSIDERATIONS

Comply with local regulations applicable to industrial plants and laws on waste disposal.

Waste waters must be treated either on site, or in certified outside plants.

In the same way, solid wastes (sludge, etc...) must be sent to a certified treatment plant (see also sections 12 and 15).

The contaminated packaging (polypropylene bag) should not be used again and must be treated in compliance with the appropriate regulations.

Remark: the user's attention is drawn to the possible existence of local or national regulations, related to disposal, which may be applicable.

14. TRANSPORT INFORMATION

United Nations Transport – N° 3288

	ADR/RID	IMDG
Class	6.1	6.1
Packing Group	III	III
Label	6.1	6.1 + marine pollutant
Hazard code	60	not applicable
Material code	3288	3288

Special precautions: with this particularly corrosive product, if the packaging for its transportation is different from the original bag, it is recommended to use corrosion-resistant materials (plastic, rubber-lined steel, etc...).

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

15. REGULATORY INFORMATION

In compliance with Directive 67/548/EEC on classification, labelling and packaging of dangerous substances, the label affixed on the container, must give the following indications:

Phrases		
	R 20	- Harmful by inhalation
	R 25	- Toxic if swallowed
	R 36/37/38	- Irritating to eyes, respiratory system and skin
	R 40	- Limited evidence of a carcinogenic effect
	R 42/43	- May cause sensitisation by inhalation and skin contact
	R 50	- Very toxic to aquatic organisms
<hr/>		
	S 22	- Do not breathe dust
	S 26	- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
	S 36/37	- Wear suitable protective clothing and gloves
	S 57	- Use appropriate container to avoid environmental contamination

Hazard symbols: « Toxic » and « Dangerous for environment »

BEFORE USE, READ THE MATERIAL SAFETY DATA SHEET

The information contained within this file is based on our current knowledge relating to the product concerned at the date of the update. It is given in good faith.

This file supplements the technical data sheet for usage but does not replace it; it is not a guarantee of the product's properties.

Furthermore, the user's attention is drawn to the risks potentially incurred when a product is used for purposes other than those for which it is designed. We assume no responsibility regarding the use of this product.

It does not exempt its user from complying with all the regulations.

These classifications and labelling texts have been decided by the manufacturer, further to a volunteer approach, nickel chloride is not appearing in the Annexe I of the Directive 67/548/EEC.

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.



MATERIAL SAFETY DATA SHEET

CRYSTALLIZED NICKEL CHLORIDE

(in compliance with EU Directive 2001/58/EC)

See also the different national and local regulations dealing with:

- 1) Health and Safety at workplace (Code of Labour).
- 2) Environment protection.
- 3) Transportation.

16. OTHER INFORMATION

- **Consult** also Toxicology File No 68 entitled "Nickel et composés minéraux" (*Nickel and mineral compounds*) published by the INRS – 1992 edition.

- **Bibliography**

[1] IARC (CIRC) Monographs on the Evaluation of Carcinogenic Risks to Humans. Chromium, Nickel and Welding – Vol. 49 (1990).

[2] Grimsrud and al. Exposure to Different Forms of Nickel and Risk of Lung Cancer, Am J Epidemiol, 2002; 156: 1123-1132.

[3] Sorahan T. and al. A mortality study of nickel chromium platers, Br. J. Ind. Med., 44, 250-258, 1987.

[4] Roberts, R.S. and al. A study of mortality in workers engaged in the mining, smelting, and refining of nickel, II : Mortality from cancer of the respiratory tract and kidney, Toxicol. Ind. Health, Vol. 5, N°6 , 975-993 (1989).

- **Web Sites**

NiPERA: <http://www.nipera.org/index.html>

NiDI: <http://www.nidi.org/>

- **Revision reasons**

- 1.2 Modification of uses.
- 1.3 Addition of a contact email.
- 1.4 Update to the emergency telephone numbers.
2. and 3. Reversal of parts 2 and 3.
- 7.2 Changes to the storage conditions.
- 8.2.1 Addition of a link to the INERIS website.
- 8.2 Change to the melting point.
- 10.3 Point regarding dangerous decomposition products.
- 12.1 Correction of "absorption" to "adsorption".
13. Change regarding contaminated packaging.

Update date: 9th January 2008

Cancels and replaces the version of June 2003

This data sheet completes, but does not replace the technical note for users. The information contained herein represents the best information currently available to us as of January 2008. They are given on a bona fide basis. In addition, the attention of users is directed to the risks which may be encountered when a product is used for applications other than the ones mentioned in the technical note for users. We make no warranty, expressed or implied, with respect to such information and we assume no liability resulting from the use of this material.
