SAFETY DATA SHEET

Nickel Oxide

SECTION 1: Identification of the substance/mixture and of the company/ undertaking

1.1 Product identifier

Product name : Nickel Oxide

Index number : 028-003-00-2

EC number : 215-215-7

REACH Registration number

Registration number	Legal entity
01-2119467172-41-0000; 01-2119467172-41-0005	HH Compliance Acting as Only Representative, Email C Terrett: info@h2compliance.com

CAS number : 1313-99-1

Product code : Not available.

Product description : Not available.

Product type : Solid.

Other means of identification : Nickel Oxide, Nickel Oxide Sinter 75, NOS 75, Nickel (II) Oxide, FMW, FEW, FEN, Green Nickel Oxide, Nickel Monoxide, Japanese Nickel Oxide, TNOS, Bunsenite, Nickel Oxide Chunks, Sinter 75

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses
Formulation or re-packing; Formulation and repackaging of nickel oxide Formulation or re-packing; Use of nickel oxide for the formulation of nickel oxide-containing catalysts and catalyst precursors Use at industrial sites; Use of nickel oxide containing catalysts Use at industrial sites; Intermediate use of nickel oxide-containing catalyst precursors for the manufacture of other nickel substances in catalysts Use at industrial sites; Intermediate use of nickel oxide for the manufacture of nickel-containing powders Use at industrial sites; Intermediate use of nickel oxide for the manufacture of nickel-containing frits Use at industrial sites; Intermediate use of nickel oxide for the manufacture of nickel-containing inorganic pigments Use at industrial sites; Intermediate use of nickel oxide for the manufacture of nickel-containing glass Use at industrial sites; Intermediate use of nickel oxide sinter in carbonyl refining (nickel carbonyl process) Use at industrial sites; Intermediate use of nickel oxide sinter in the production of stainless, special steels and special alloy Use at industrial sites; Use of nickel oxide for the production of nickel-containing electronics and thermally functioning ceramics Use at industrial sites; Use of nickel oxide powder for the production of nickel zinc ferrite cores Service life (worker at industrial site); Service life of nickel-containing electronics/ferrite cores in industrial settings Service life (professional worker); Service life of nickel-containing electronics/ferrite cores in professional settings Service life (consumers); Service life of nickel-containing electronics/ferrite cores used by consumers Use at industrial sites; Use of nickel oxide for the production of nickel oxide containing automotive catalysts Service life (worker at industrial site); Production of vehicle exhaust systems in industrial settings Service life (professional worker); Service life of vehicle exhaust systems in professional settings Service life (consumers); Catalysis application in vehicles used by consumers

Uses advised against	Reason
Use of nickel and nickel compounds in tattoo inks or permanent makeup products.	

1.3 Details of the supplier of the safety data sheet

Vale Canada Limited, 200 Bay Street, Royal Bank Plaza, Suite 1500, South Tower, PO Box 70, Toronto, Ontario, Canada, M5J 2K2, Email: msds@vale.com

SECTION 1: Identification of the substance/mixture and of the company/ undertaking

e-mail address of person responsible for this SDS : msds@vale.com

National contact

Manufacturer
Vale Canada Limited, Ontario Operations, Sudbury, Ontario, Canada P0M 1N0, Email: msds@vale.com
Vale Japan Limited, Matsusaka Plant, 345-52 Ryoshicho, Matsusaka City, Email: msds@vale.com

Distribution
Vale Canada Limited, 200 Bay Street, Royal Bank Plaza, Suite 1500, South Tower, PO Box 70, Toronto, Ontario, Canada, M5J 2K2, Email: msds@vale.com
Vale Japan Limited, Matsusaka Plant, 345-52 Ryoshicho, Matsusaka City, Email: msds@vale.com

Importer
Vale Americas Inc., 140 E. Ridgewood Avenue, Suite 415, South Tower, Paramus, NJ 07652, U.S.A, Email: msds@vale.com
Vale International SA, Route de Pallatex 29, 1162 Saint-Prex, Switzerland, Email: msds@vale.com
Vale Base Metals Asia Pacific PTE. Limited, One Temasek Avenue #18-01/02, Millenia Tower, Singapore, 039192, Email: msds@vale.com
Vale Holdings BV, Piet Heinkade 55, 1019GM, Amsterdam, The Netherlands, Telephone Number 31 20 308 5644 214, Email: msds@vale.com

REACH Only Representative for Vale: HH Compliance, Rubicon Building, CIT Campus, T12Y275, Bishopstown, Cork, Republic of Ireland; OR Manager, Telephone number: +353-21-486-81121, Email C Terrett: info@h2compliance.com

1.4 Emergency telephone number

National advisory body/Poison Center

Telephone number : None identified.

Supplier

Telephone number : For Fire, Spill, or Chemical Emergency call CHEMTREC: +1 703 527-3887; for Europe call CHEMTREC: +(44) 870 8200418

Hours of operation : 24-hour telephone and/or website

Information limitations : Emergency essential information

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Multi-constituent substance

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Acute Tox. 4, H332
Resp. Sens. 1, H334
Skin Sens. 1, H317
Carc. 1A, H350i
Repr. 1B, H360
STOT RE 1, H372
Aquatic Chronic 2, H411

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

See Section 16 for the full text of the H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms :

SECTION 2: Hazards identification

Signal word : Danger

Hazard statements : Harmful if inhaled.
May cause an allergic skin reaction.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause cancer.
May damage fertility or the unborn child.
Causes damage to organs through prolonged or repeated exposure.
Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention : Obtain special instructions before use. Wear protective gloves, protective clothing, eye protection, face protection, or hearing protection. Wear respiratory protection. Avoid release to the environment. Do not breathe dust or mist. Do not eat, drink or smoke when using this product. Wash thoroughly after handling.

Response : Collect spillage. IF exposed or concerned: Get medical advice or attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor. If experiencing respiratory symptoms: Call a POISON CENTER or doctor. Take off contaminated clothing and wash it before reuse. IF ON SKIN: Wash with plenty of water. If skin irritation or rash occurs: Get medical advice or attention.

Storage : Not applicable.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazardous ingredients : nickel monoxide

Supplemental label elements : Not applicable.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Restricted to professional users.

Special packaging requirements

Containers to be fitted with child-resistant fastenings : Not applicable.

Tactile warning of danger : Not applicable.

2.3 Other hazards

Product meets the criteria for PBT or vPvB according to Regulation (EC) No. 1907/2006, Annex XIII :

PBT	P	B	T	vPvB	vP	vB
Not applicable (Inorganic)	N/A	N/A	N/A	Not applicable (Inorganic)	N/A	N/A

Other hazards which do not result in classification : None known.

SECTION 3: Composition/information on ingredients

3.1 Substances : Multi-constituent substance

SECTION 3: Composition/information on ingredients

Product/ingredient name	Identifiers	%	Classification	Specific Conc. Limits, M-factors and ATEs	Type
nickel monoxide	EC: 215-215-7 CAS: 1313-99-1 Index: 028-003-00-2	100	Acute Tox. 4, H332 Resp. Sens. 1, H334 Skin Sens. 1, H317 Carc. 1A, H350i Repr. 1B, H360 STOT RE 1, H372 Aquatic Chronic 2, H411	ATE [Inhalation (dusts and mists)] = 1.20 mg/l	[*]
copper(II) oxide	EC: 215-269-1 CAS: 1317-38-0 Index: 029-016-00-6	0.2 - 9	Acute Tox. 4, H302 Aquatic Acute 1, H400 Aquatic Chronic 1, H410	ATE [Oral] = 470 mg/kg M [Acute] = 100 M [Chronic] = 10	[2]
cobalt oxide	EC: 215-154-6 CAS: 1307-96-6 Index: 027-002-00-4	0.5 - 1.5	Acute Tox. 3, H301 Skin Sens. 1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410	ATE [Oral] = 202 mg/kg M [Acute] = 10 M [Chronic] = 10	[2]
nickel dihydroxide	EC: 235-008-5 CAS: 12054-48-7 Index: 028-008-00-X	0 - 0.5	Acute Tox. 4, H302 Acute Tox. 2, H330 Skin Irrit. 2, H315 Resp. Sens. 1, H334 Skin Sens. 1, H317 Muta. 2, H341 Carc. 1A, H350i Repr. 1B, H360D STOT RE 1, H372 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 **See Section 16 for the full text of the H statements declared above.**	ATE [Oral] = 1515 mg/kg ATE [Inhalation (vapours)] = 1.2 mg/l M [Acute] = 1 M [Chronic] = 1	[1]

There are no additional ingredients present which, within the current knowledge of the supplier, are classified and contribute to the classification of the substance and hence require reporting in this section.

Type

[*] Substance
[1] Constituent
[2] Impurity

Occupational exposure limits, if available, are listed in Section 8.

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie,

SECTION 4: First aid measures

belt or waistband. In the event of any complaints or symptoms, avoid further exposure.

Skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
irritation
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma
reduced fetal weight
increase in fetal deaths
skeletal malformations

Skin contact : Adverse symptoms may include the following:
irritation
redness
reduced fetal weight
increase in fetal deaths
skeletal malformations

Ingestion : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : This material is very toxic to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous combustion products : Decomposition products may include the following materials:
metal oxide/oxides

5.3 Advice for firefighters

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

6.2 Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

6.3 Methods and materials for containment and cleaning up

Small spill : Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor.

6.4 Reference to other sections : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

7.1 Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe dust. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Seveso Directive - Reporting thresholds

Named substances

Name	Notification and MAPP threshold	Safety report threshold
Nickel compounds inhalable powder form	-	1 tonne

7.3 Specific end use(s)

Recommendations : Not available.

Industrial sector specific solutions : Not available.

SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. Information is provided based on typical anticipated uses of the product. Additional measures might be required for bulk handling or other uses that could significantly increase worker exposure or environmental releases.

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
nickel monoxide	**EU OEL (Europe, 1/2022). [nickel compounds] Skin sensitizer. Inhalation sensitizer.** TWA: 0.1 mg/m³, (as nickel) 8 hours.
nickel dihydroxide	**EU OEL (Europe, 1/2022). [nickel compounds] Skin sensitizer. Inhalation sensitizer.** TWA: 0.1 mg/m³, (as nickel) 8 hours.

Biological exposure indices

No exposure indices known.

SECTION 8: Exposure controls/personal protection

Recommended monitoring procedures : Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

Product/ingredient name	Type	Exposure	Value	Population	Effects
Nickel	DNEL	Long term Dermal	0.035 mg/cm²	Workers	Local
	DNEL	Acute Inhalation	11.9 mg/m³	General population	Local
	DNEL	Long term Inhalation	0.05 mg/m³	Workers	Systemic
	DNEL	Long term Inhalation	0.05 mg/m³	Workers	Local

PNECs

Product/ingredient name	Compartment Detail	Value	Method Detail
Nickel	Fresh water	7.1 µg/l	-
	Fresh water sediment	109 mg/kg	-
	Marine water	8.6 µg/l	-
	Marine water sediment	109 mg/kg	-
	Soil	29.9 mg/kg	-

8.2 Exposure controls

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields. If operating conditions cause high dust concentrations to be produced, use dust goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

SECTION 8: Exposure controls/personal protection

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

9.1 Information on basic physical and chemical properties

Appearance

Physical state : Solid.

Color : Green. Black.

Odor : Not available.

Odor threshold : Not available.

Melting point/freezing point : 1984°C

Initial boiling point and boiling range : Not available.

Flammability : Not available.

Lower and upper explosion limit : Not applicable.

Flash point : Not applicable.

Auto-ignition temperature : >400°C (>752°F) [EU A.16]

Decomposition temperature : Not available.

pH : Not available.

Viscosity : Not applicable.

Solubility in water : 0.0000352 g/l [EU A.6]

Partition coefficient: n-octanol/water : Not applicable.

Vapor pressure : Not available.

Relative density : Not available.

Density : 6.7 g/cm³ [20°C (68°F)]

Vapor density : Not applicable.

Explosive properties : Not available.

Oxidizing properties : Not available.

Particle characteristics

Median particle size : Not available.

Size distribution :

Distribution (dN)	Size
10	100 µm

SECTION 10: Stability and reactivity

10.1 Reactivity : No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability : The product is stable.

10.3 Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid : No specific data.

10.5 Incompatible materials : No specific data.

10.6 Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
copper(II) oxide	LD50 Oral	Rat	470 mg/kg	-
cobalt oxide	LD50 Oral	Rat	202 mg/kg	-
	TDLo Intratracheal	Rat	25 mg/kg	-
nickel dihydroxide	LC50 Inhalation Vapor	Rat	1200 mg/m³	4 hours
	LD50 Oral	Rat	1515 mg/kg	-

Conclusion/Summary : Harmful if inhaled.

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
nickel monoxide	413.9	N/A	N/A	1.2	N/A
copper(II) oxide	470	N/A	N/A	N/A	N/A
cobalt oxide	202	N/A	N/A	N/A	N/A
nickel dihydroxide	1515	N/A	N/A	1.2	N/A

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitization

Product/ingredient name	Route of exposure	Species	Result
cobalt oxide	Respiratory	Mammal - species unspecified	Sensitizing

Conclusion/Summary

Skin : May cause an allergic skin reaction.

Respiratory : May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Nickel compounds	Carcinogen Potential	N/A	N/A	Inhalation

SECTION 11: Toxicological information

Conclusion/Summary : May cause cancer if inhaled.

Reproductive toxicity

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
cobalt oxide	-	-	-	-	-	-

Conclusion/Summary : May damage fertility or the unborn child.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Product/ingredient name	Category	Route of exposure	Target organs
nickel monoxide nickel dihydroxide	Category 1 Category 1	Inhalation Inhalation	lungs lungs

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Inhalation : Fatal if inhaled. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Skin contact : May cause an allergic skin reaction.

Ingestion : Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
irritation
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing
wheezing and breathing difficulties
asthma
reduced fetal weight
increase in fetal deaths
skeletal malformations

Skin contact : Adverse symptoms may include the following:
irritation
redness
reduced fetal weight
increase in fetal deaths
skeletal malformations

Ingestion : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

SECTION 11: Toxicological information

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
Nickel Oxide				

Conclusion/Summary : Causes damage to organs through prolonged or repeated exposure.

General : Causes damage to organs through prolonged or repeated exposure. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : May cause cancer if inhaled. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : May damage the unborn child.

11.2 Information on other hazards

11.2.1 Endocrine disrupting properties

Not available.

11.2.2 Other information

Not available.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
copper(II) oxide	Acute LC50 2.6 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 >56000 ppm Fresh water	Fish - Gambusia affinis - Adult	96 hours

Conclusion/Summary : Toxic to aquatic life with long lasting effects.

12.2 Persistence and degradability

Conclusion/Summary : Not available.

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
nickel monoxide	-	5613	high
cobalt oxide	-	15600	high
nickel dihydroxide	-	5613	high

12.4 Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Mobility : Not available.

SECTION 12: Ecological information

12.5 Results of PBT and vPvB assessment

Product/ingredient name	PBT	P	B	T	vPvB	vP	vB
nickel monoxide	Not applicable (Inorganic)	N/A	N/A	N/A	Not applicable (Inorganic)	N/A	N/A

12.6 Endocrine disrupting properties

Not available.

12.7 Other adverse effects

No known significant effects or critical hazards.

SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

Product

Methods of disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

Hazardous waste : The classification of the product may meet the criteria for a hazardous waste.

Packaging

Methods of disposal : The generation of waste should be avoided or minimized wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	ADR/RID	ADN	IMDG	IATA
14.1 UN number or ID number	Not regulated.	Not regulated.	Not regulated.	Not regulated.
14.2 UN proper shipping name	-	-	-	-
14.3 Transport hazard class(es)	-	-	-	-
14.4 Packing group	-	-	-	-
14.5 Environmental hazards	No.	No.	No.	No.

SECTION 14: Transport information

14.6 Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Maritime transport in bulk according to IMO instruments : Not available.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorization

Annex XIV

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Restricted to professional users.

Other EU regulations

Industrial emissions (integrated pollution prevention and control) - Air : Not listed

Industrial emissions (integrated pollution prevention and control) - Water : Not listed

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Persistent Organic Pollutants

Not listed.

Seveso Directive

This product is controlled under the Seveso Directive.

Named substances

Name
Nickel compounds inhalable powder form

National regulations

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

SECTION 15: Regulatory information

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia	:	All components are listed or exempted.
Canada	:	All components are listed or exempted.
China	:	All components are listed or exempted.
Eurasian Economic Union	:	**Russian Federation inventory**: All components are listed or exempted.
Japan	:	**Japan inventory (CSCL)**: All components are listed or exempted. **Japan inventory (ISHL)**: Not determined.
New Zealand	:	All components are listed or exempted.
Philippines	:	All components are listed or exempted.
Republic of Korea	:	All components are listed or exempted.
Taiwan	:	All components are listed or exempted.
Thailand	:	All components are listed or exempted.
Turkey	:	All components are listed or exempted.
United States	:	All components are active or exempted.
Viet Nam	:	All components are listed or exempted.
15.2 Chemical Safety Assessment	:	This product contains substances for which Chemical Safety Assessments are still required.

SECTION 16: Other information

Indicates information that has changed from previously issued version.

Abbreviations and acronyms :

ATE = Acute Toxicity Estimate
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
EUH statement = CLP-specific Hazard statement
N/A = Not available
PBT = Persistent, Bioaccumulative and Toxic
PNEC = Predicted No Effect Concentration
RRN = REACH Registration Number
SGG = Segregation Group
vPvB = Very Persistent and Very Bioaccumulative

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Acute Tox. 4, H332	On basis of test data
Resp. Sens. 1, H334	On basis of test data
Skin Sens. 1, H317	Regulatory data
Carc. 1A, H350i	Regulatory data
Repr. 1B, H360	Calculation method
STOT RE 1, H372	Regulatory data
Aquatic Chronic 2, H411	Calculation method

Full text of abbreviated H statements

SECTION 16: Other information

H301	Toxic if swallowed.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H330	Fatal if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341	Suspected of causing genetic defects.
H350i	May cause cancer if inhaled.
H360D	May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS]

Acute Tox. 4	ACUTE TOXICITY - Category 4
Skin Sens. 1	SKIN SENSITIZATION - Category 1
Resp. Sens. 1	RESPIRATORY SENSITIZATION - Category 1
Carc. 1A	CARCINOGENICITY - Category 1A
Repr. 1B	TOXIC TO REPRODUCTION - Category 1B
STOT RE 1	SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 1
Aquatic Chronic 2	AQUATIC HAZARD (LONG-TERM) - Category 2

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