

MATERIALS SAFETY DATA SHEET

ZINC OXIDE

(PRODUCED BY FRENCH PROCESS)

1. Identification of substance/ Mixture and of the company/undertaking:

1.1 Product identifier

Product name	: Zinc oxide
common commercial name	: Zinc oxide
synonyms	: NA
product grades	: All commercial quality product grades
Chemical formula	: ZnO
Cas no.	: 1314 -13 - 2
Einecs number	: Not applicable

1.2 Relevant identified uses of the substance/mixture:

Production rubber, tires, Ceramic, Paint, Polymers and Manufacture of chemicals.

1.3 Details of the supplier of the safety data sheet

2. HAZARD IDENTIFICATION

Product definition: Mono – constituent substance

physical / chemical hazards: Hazardous to aquatic environment

No special danger to health. No ignition hazard and reaction hazard under normal condition

Routs of entry 1. Inhalation 2. Mechanical irritation to skin and

eyes Signs and symptoms of exposure dry throat, cough, dry itching skin

Effects of (over) exposure,
Inhalation & ingestion

Zinc oxide is not toxic but may cause zinc chill or brass founder's aque / metal fume fever. However, workers continuously exposed, quickly develop resistance. Zinc chill is more common with zinc metal rather than zinc oxide. Zinc oxide dust may lock the ducts of sebaceous and give rise to a popular pustular eczema in men, packaging this compound.

Skin contact
Eye contact

May cause irritation, in some cases, on exposure to skin and eyes

Environment hazards:

Not water soluble. If chemically in solution, the net zn in certain situations is toxic to a limited group of aquatic organisms.

U.S.A.: not regulated
EU member countries: regulated

Classification of the substance or mixture:

Zinc oxide. Signal word: warning.
H410: very toxic to aquatic life with long lasting effects.
P273: avoid release to the environment.
P391: collect spillage.
P501: dispose of contents / container as hazardous or special waste in accordance with applicable law.

Labeling in EU countries:



3. COMPOSITION / DATA ON COMPONENTS

<u>CHEMICAL NAME</u>	<u>CAS NO.</u>	<u>RANGE</u>	<u>OTHER</u>
ZINC OXIDE (ZnO)	1314 - 13 - 2	99 -100%	(1)
LEAD (AS PbO)	1317 - 36 - 8	< 0.15%	IMPURITY (1)
CADMIUM (AS Cd)	1306 - 19 - 0	< 0.025%	IMPURITY (1)
MOISTURE (AS H2O)	7732 - 18 - 5	< 0.3%	POST MANUFACTURING (2)
ZINC CARBONATE (ZnCO3)	5970 - 47 - 8	<0.1%	POST MANUFACTURING (2)

(1): This SDS is not a TDS (Technical Data Sheet) or Specification and covers a range of product grades and customer specifications, where the hazards and controls are substantially similar and covered by the same SDS. See the specific grade TDS or specification covering the tender for specific ZnO minimum assay and maximum Pb and Cd naturally occurring impurity levels.

(2): Moisture is a post manufacturing degradation impurity. The product is manufactured in a high temperature distillation process, absent of volatiles. After finished product is manufactured, due to zinc oxide's hygroscopic crystal size, zinc oxide has a natural affinity to attract and hold some moisture from humidity in the air. This occurs post manufacturing and is beyond the manufacturer's control. Product is manufacturing and sold dry basis. However, since some moisture will be present at point of end use, it is mentioned as information for the end user in this SDS.

(3): Zinc oxide naturally reacting with carbon dioxide (CO2) in ambient air, and is the basis for a shelf life expiration of the product ($ZnO + CO_2 = ZnCO_3$). This occurs post manufacturing. As with moisture, product is manufactured and sold dry basis, and this item is listed on this SDS as information only for the end user information only as it may be present at end user and is not a constituent of the product as manufactured. ZnCO3 is a volatile decomposing around 260C (500F) to CO2 gas and ZnO powder.

4. FIRST AID MEASURES

4.1 Most important symptoms and effects, both acute and delayed

Eye contact	Exposure to airborne concentrations above statutory or recommended exposure Limits may cause irritation of the eyes.
Inhalation	Exposure to airborne concentrations above statutory or recommended exposure Limits may cause irritation of the nose, throat and lungs.
Ingestion	No known significant effects or critical hazards.
Skin contact	No known significant effects or critical hazards.

Over-exposure signs/symptoms:

Eye contact:	Adverse symptoms may include the following: <ul style="list-style-type: none"> • Irritation • Redness
Inhalation:	Adverse symptoms may include the following: <ul style="list-style-type: none"> • Respiratory tract irritation • Coughing
Skin contact:	No specific data.
Ingestion:	No specific data.

4.2 Description of first aid measures

Ingestion	Do not induce vomiting give large amount of water or milk if available transport to medical facility.
Inhalation	Remove to fresh air if effects occur. Consult a physician.
Skin contact	Continued and thorough washing in flowing water is imperative. If irritation of skin still persists, consult physician.
Eye contact	Immediate and continuous irrigation with flowing water. Prompt medical consultation is essential

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.

5. **Firefighting measures**

Firefighting measures

No extinguishing media required as zinc oxide does not ignite.

Fire extinguishing media

Use any means suitable for extinguishing surrounding fire

6. **ACCIDENTAL RELEASE MEASURE**

6.1 personal precautions

Zno is non toxic but may cause zinc chills / brass founder's aque. Dust respirator with universal cartridge recommended it is nuisance particulates. No after effects are noted except irritation in some cases on exposure to skin and eye.

6.2 Environmental precautions

Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or Drains.

Retain contaminated washing water and dispose it.

In case of escape or of entry into waterways, soil or drains, inform the responsible Authorities as required.

Suitable material for taking up wet product: absorbing material, organic, sand

6.3 method of cleaning up	
Small spill	Move containers from spill area. Vacuum or sweep up material and place 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. Vacuum or sweep up material And place in a designated, labeled waste container. Avoid creating dusty conditions And prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid release to the environment. 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. 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. Keep away from acids or bases.

7.3 Specific end use(s)

Recommendations: Not available
Industrial sector specific: Not available
solutions

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1 Control parameters

Country/organization	8 hour-TWA	15 min-STEEL mg/m ³
Germany (MAK)	5 mg/m ³ (fumes) 6 mg/m ³ (dust)	Einatembarer Staub (Dust) = 10 mg/m ³ Alveolengängiger Staub = 3 mg/m ³
France (INRS)	5 mg/m ³ (fume) 10 mg/m ³ (dust)	
UK (OEL)	5 mg/m ³ (fumes) 10 mg/m ³ (dust)	TWA – 8 hours: 5 mg/m ³ (nuisance dust) STEL – 15 minutes: 10 mg/m ³ (nuisance dust)
The Netherlands	5 mg/m ³ (fumes)	
Sweden	5 mg/m ³ (fumes)	
Denmark	4 mg/m ³ (fumes) 10 (dust)	

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory Protective equipment. Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous Substanc

Derived effect levels

Product/ingredient name	Type	Exposure	Value	Population	Effects
Zinc Oxide	DNEL	Oral	62,2 mg/day	Workers	Local
	DNEL	Dermal	6223 mg/day	Workers	Local
	DNEL	Inhalation	6,2 mg/m ³	Workers	Local
	DNEL	Inhalation	3,1 mg/m ³	Consumers	Local

Predicted effect concentrations

Product / ingredient name	Type	Compartment Detail	Value	Method Detail
Zinc Oxide	PNEC	Fresh water	25,6 µg/l	-
	PNEC	Marine	7,6 µg/l	-
	PNEC	Fresh water sediment	146 mg/kg dwt	-
	PNEC	Sewage Treatment	64,7 µg/l	-
		Plant		
	PNEC	Marine water sediment	70,3 mg/kg dwt	-
	PNEC	Soil	44,3 mg/kg dwt	-

8.2 Exposure controls

Appropriate engineering controls	Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below a recommended or statutory limit.
Individual protection & Hygiene measures	Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed.
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 operating conditions cause high dust concentrations to be produced, use dust goggles.
Skin & 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.
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. Recommended: Gloves: Use cotton or leather gloves.
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.
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	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and The safe working limits of the selected respirator.
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.

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	Solid.
Color	White.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Sublimation temperature: 1975°C
Initial boiling point and boiling range	Not available.
Flash point	[Product does not sustain combustion.]
Evaporation rate	Not available.
Flammability of the product	Non-flammable.
Flammability (solid, gas)	Not available.
Burning time	Not available.
Burning rate	Not available.
Upper/lower flammability or explosive limits	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Density	5,3 to 5,6 g/cm ³
Solubility(ies)	Insoluble in the following materials: cold
Partition coefficient: n-	Not available.
Octanol / water	
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity (20°C / 40°C)	Not available.
Explosive properties Oxidizing properties	Not available. Not available.

9.2 Other information

No additional information.

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 Reactive or incompatible with the following materials: acids and alkalis. Keep away from acids or bases.
- 10.6 Hazardous decomposition products Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11. TOXICOLOGICAL INFORMATION

Product/ingredient name	Result	Species	Dose	Exposure
Zinc Oxide	LC50 Inhalation Dusts and mists	Rat	>5700 mg/m ³	4 hours
	LD50 Oral	Rat	>5000 mg/kg	-
	LD50 Oral	Rat	15000 mg/kg	-

- Chronic toxicity: NOAEL: 50 mg/ Zn/day (based on human clinical studies).
- Mutation: No evidence of genetic toxicity, in-vitro tests.
- Reproduction toxicity: No evidence of reproduction toxicity.
- Acute toxicity – Dermal: No data available.
- Aspiration hazard: No data available
- Respiratory tract: Not irritant (Klimish et al, 1982)
- Sensitization: No sensitizing potential (guinea pig). (Van Huygevoort, 1999 g,h)
Not irritating (rabbit). OECD 404. (Löser, 1977; Lansdown, 1991)
- Skin irritation: Not irritating (rabbit). OEDC 405.
- Eye irritation: Not irritating (rabbit). OEDC 405.
- Carcinogenicity: No evidence of carcinogenicity in laboratory animals or in man. Not an IARC carcinogen.

- Eye irritation: Not irritating (rabbit). (Van Huygevoort 1999; Thijssen,1978; Löser,1977)
- Ingestion: Product is Generally Recognized As Safe (GRAS) and a use is zinc vitamin supplement. There are reports that in the event of excess zinc oxide ingestion, the body uses a greater amount of copper vitamin which may lead to a copper deficiency.

Germ cell mutagenicity: No biologically relevant genotoxic activity (based on cross-reading between Zn compounds; no classification for mutagenicity required) (Chemical Safety report (CSR) zinc oxide. 2010).

Carcinogenicity: No experimental or epidemiological evidence exists to justify classification of zinc compounds for carcinogenic activity (based on cross-reading between Zn compounds; no classification for carcinogenicity required) (Chemical Safety report (CSR) zinc oxide. 2010)

Reproductive toxicity: No experimental or epidemiological evidence exists to justify classification of zinc compounds for reproductive or developmental toxicity (based on cross-reading between Zn compounds; no classification for reproductive toxicity required) (Chemical Safety report (CSR) zinc oxide. 2010)

Specific target organ toxicity (single exposure): No experimental or epidemiological sufficient evidence for specific target organ toxicity (single exposure) (no classification for target organ toxicity (single exposure: STOT-SE) required) (Heydon and Kagan, 1990; Gordon *et al.*, 1992; Mueller and Seger, 1985 [Cited in Chemical Safety report (CSR) zinc oxide. 2010])).

Specific target organ toxicity (repeated exposure): No experimental or epidemiological sufficient evidence for specific target organ toxicity (repeated exposure) (no classification for specific target organ toxicity (repeated exposure: STOT-RE) required) (Lam *et al.*, 1985, 1988; Conner *et al.* 1988 [Cited in Chemical Safety report (CSR) zinc oxide. 2010]))

12. ECOLOGICAL INFORMATION

Product/ingredient name	Result	Species	Exposure
zinc oxide	Acute EC50 0,17 mg/l	Algae - Selenastrum Capricornutum	72 hours
	Acute LC50 1,1 to 2,5 ppm Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Chronic NOEC 0,4 mg/L Fresh water	Daphnia - Daphnia magna -Neonate	48 hours

12.2 Persistence and degradability	Not available.
12.3 Bioaccumulative potential	Not available.
12.4 Mobility in soil Soil/water partition coefficient (K_{oc})	Not available.
12.5 Results of PBT and vPvB assessment	Not available.
PBT	Not applicable. P: Not available. B: Not available. T: Not available.
vPvB	Not applicable. vP: Not available. vB: Not available.
12.6 Other adverse effects	No known significant effects or critical hazards.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Methods of disposal

The generation of waste should be avoided or minimized wherever possible. : Significant quantities of waste product residues should not be disposed of via the Foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus And non-recyclable products via a licensed waste disposal contractor. 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.

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.

DISPOSAL

WHATEVER CAN NOT BE SAVED FOR RECOVERY OR RECYCLING SHOULD BE MANAGED IN AN APPROPRIATE AND APPROVED WASTE DISPOSAL FACILITY

14. **TRANSPORT INFORMATION**

	ADR/RID	ADN/ADNR	IMDG	IATA
14.1 UN number	UN3077	UN3077	UN3077	UN3077
14.2 UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (zinc oxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (zinc oxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (zinc oxide) Marine pollutant (zinc oxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (zinc oxide)
14.3 Transport hazard class(es)	9	9	9	9
				
14.4 Packing group	III	III	III	III

14.5 Environmental hazards	Yes	Yes	Yes	Yes
14.6 Special precautions for user	Not Available			
Additional information				<u>Passenger and Cargo Aircraft</u> , Quantity limitation: 400 kg Packaging instructions: 956.
	Hazard identification number 90		<u>Emergency schedules (EmS)</u> F-A, S-F	
	Limited quantity, 5 kg			
	Special provisions, 274 335 601			<u>Cargo Aircraft Only</u> , Quantity limitation: 400 kg Packaging instructions: 956
	Tunnel code (E)			<u>Limited Quantities - Passenger Aircraft</u> , Quantity limitation: 400 kg Packaging instructions: Y956
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not available.			

15. **REGULATORY INFORMATION**

REACH

PRE – REGISTRATION NUMBER:

05-2117433572-47-0000 (FOR ZINC OXIDE)

REGULATORY INFORMATION AS PER EC DIRECTIVES:

NOT AVAILABLE, CUSTOMMER MAY SPECIFY THE REQUIREMENTS ABOUT LABELLING BASED ON THE REGULATIONS OF THAT COUNTRY

16. **OTHER INFORMATION**

HAZARD RATING:

Health - 1

Flammability - 0

Reactivity - 0

Personnel Protection - E

Rating Definitions

0 – Minimal 1-Slight 2- Moderate

3- Serious 4 – Severe

Personal Protective Index: E (recommended with bulk dust only) = Gloves + Mask + Goggles.

DISCLAIMER: -

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