SAFETY DATA SHEET

ZINC OXIDE

CAS No.: 1314-13-2

This Safety Data Sheet is issued by Suraj Chemicals as the distributor/supplier of record, based on manufacturer and published GHS / regulatory reference data for this substance. Users should also consult the specific manufacturer's SDS where available.

1. IDENTIFICATION

GHS Product identifier

ZINC OXIDE
Zinc White, Flowers of Zinc, Chinese White, Zincite
CAS: 1314-13-2

Other means of identification

Not relevant

Recommended use of the chemical and restrictions on use

Relevant uses: Rubber compounding (activator), ceramics and glass, paints and coatings, cosmetics and pharmaceuticals, animal feed micronutrient, agriculture (zinc micronutrient), plastics/PVC stabiliser component, electronics/ferrite manufacture. For industrial user only.

Uses advised against: All uses not specified in this section or in section 7.3.

Supplier's details

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2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS:
Classification of this product has been carried out in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), based on the harmonised/standard classification for zinc oxide.

Aquatic Acute 1	Hazardous to the aquatic environment, acute hazard, Category 1, H400
Aquatic Chronic 1	Hazardous to the aquatic environment, chronic hazard, Category 1, H410

Not classified for acute oral/dermal toxicity, skin/eye irritation or sensitisation based on available data. Inhalation of freshly formed fine fume/dust in occupational settings is associated with metal fume fever (see Section 11) but does not carry a harmonised STOT classification for this substance.

GHS label elements, including precautionary statements

GHS: Warning

Hazard statements

Aquatic Acute 1: H400 – Very toxic to aquatic life.
Aquatic Chronic 1: H410 – Very toxic to aquatic life with long lasting effects.

Precautionary statements

P264: Wash hands thoroughly after handling.
P273: Avoid release to the environment.
P280: Wear protective gloves/eye protection where dust is generated.
P391: Collect spillage.
P501: Dispose of contents/container in accordance with local regulations on hazardous waste, in particular to avoid release to the aquatic environment.

Other hazards which do not result in classification

Inhalation of freshly generated zinc oxide fume (e.g. from welding/melting galvanised or brass items) can cause metal fume fever, a transient flu-like illness; this is a recognised occupational effect for the fume form and is not applicable to normal handling of the powder/granular product at ambient temperature. Not identified as PBT/vPvB.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substances

Chemical description: Zinc Oxide (industrial grade powder/granules)

In accordance with Annex 4.3.3 of the GHS, the product contains:

Identification	Chemical Name / Classification	Concentration
CAS: 1314-13-2	Zinc oxide – Aquatic Acute 1: H400; Aquatic Chronic 1: H410	Min. 99.0% ZnO (industrial grade; grade-specific assay available on request)

To obtain more information on the hazards of the substances, consult sections 11, 12 and 16.

Mixtures

Non-applicable

4. FIRST AID MEASURES

Description of necessary first-aid measures

Under normal handling, first aid is generally not required. If needed:

By inhalation

Remove the person affected from the area of exposure to fresh air and keep at rest. If symptoms of metal fume fever (chills, fever, muscle aches) develop following exposure to fume, seek medical attention.

By skin contact

Wash affected skin with soap and water. Not normally irritating; seek medical attention if irritation persists.

By eye contact

Rinse eyes thoroughly with plenty of water for several minutes, holding eyelids open. If irritation persists, seek medical attention.

By ingestion/aspiration

Rinse mouth with water. Do not induce vomiting. Give water to drink if the person is conscious. Seek medical advice if a large quantity is swallowed.

Most important symptoms/effects, acute and delayed

Low acute oral/dermal toxicity. Inhalation of freshly formed fume may cause delayed, transient flu-like symptoms (metal fume fever) some hours after exposure. See sections 2 and 11.

Indication of immediate medical attention and special treatment needed, if necessary

Treat metal fume fever symptomatically (rest, fluids, antipyretics); symptoms are generally self-limiting within 24–48 hours.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Suitable: Product itself is non-combustible; use extinguishing media appropriate to the surrounding fire (water spray, foam, dry chemical powder, carbon dioxide).
Unsuitable: None known.

Specific hazards arising from the chemical

Non-combustible, non-flammable inorganic solid. Not explosive. Finely divided zinc dust (not zinc oxide) can be combustible – zinc oxide itself does not present this hazard under normal conditions.

Special protective actions for fire-fighters

Wear self-contained breathing apparatus and standard fire-fighting protective clothing when fighting a fire in the vicinity of this product, to avoid inhalation of fume generated by the surrounding fire. Cool fire-exposed containers with water spray from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Avoid generating and inhaling dust. Use PPE as described in Section 8.

For emergency responders

No special measures beyond routine dust control PPE required.

Environmental precautions

Prevent entry into drains, watercourses and soil – very toxic to aquatic life with long lasting effects. Notify relevant authorities in case of significant release.

Methods and materials for containment and cleaning up

Sweep or vacuum up spilled material (avoid dry sweeping that generates dust where possible; use a vacuum with appropriate filtration) and place in a suitable labelled container for reuse or disposal.

Reference to other sections

See sections 8 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling

A. General precautions for safe use

Avoid generating and breathing dust. Provide good general/local exhaust ventilation, especially in grinding, blending or bagging operations.

B. Technical recommendations for the prevention of fires and explosions

No specific fire/explosion prevention measures required for zinc oxide itself; standard good housekeeping applies.

C. Technical recommendations on general occupational hygiene

Do not eat, drink or smoke during handling; wash hands and exposed skin after handling.

D. Technical recommendations to prevent environmental risks

Prevent product/dust from entering drains, soil or watercourses. Provide containment for bulk storage/handling areas.

Conditions for safe storage, including any incompatibilities

A. Specific storage requirements

Minimum Temp.	Ambient
Maximum Temp.	Ambient (no special limit; protect from moisture ingress)
Maximum time	24 Months (unopened original packaging, dry storage)

B. General conditions for storage

Store in a cool, dry, well-ventilated place, away from strong acids, in tightly closed bags/containers.

Specific end use(s)

Except for the instructions already specified, it is not necessary to provide any special recommendation regarding the uses of this product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Substances whose occupational exposure limits have to be assessed in the workplace, per the Factories Act, 1948, and widely referenced international OELs for zinc oxide:

Identification	Occupational Exposure Limit Type	Value
Zinc oxide (respirable fraction) CAS: 1314-13-2	Time Weighted average concentration (8 hrs)	2 mg/m³
	Short-term exposure limit (15 min)	10 mg/m³
Zinc oxide (total dust) CAS: 1314-13-2	Time Weighted average concentration (8 hrs)	10 mg/m³

Appropriate engineering controls

Use local exhaust ventilation at grinding, blending, bagging and dosing operations to control dust levels below occupational exposure limits.

B. Respiratory protection

Particulate respirator (e.g. FFP2/N95 or higher) where dust levels approach or exceed exposure limits; use fume-rated respiratory protection if the product is heated to fume-generating temperatures.

C. Specific protection for the hands

Protective gloves recommended for prolonged handling.

D. Eye and face protection

Safety glasses/goggles recommended where dust is generated.

E. Bodily protection

Standard work clothing; coveralls for dusty operations.

F. Additional emergency measures

Eyewash station recommended in the work area.

Environmental exposure controls

Avoid environmental spillage of both the product and its container. See subsection 7.1.D.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	
Physical state at 20°C	Solid (powder/granules)
Appearance	Fine powder
Color	White to pale yellowish-white (yellows slightly on heating, reverts on cooling)
Odor	Odourless
Odour threshold	Not relevant *
Volatility	
Boiling point at atmospheric pressure	Approx. 2360°C (sublimes/decomposes)
Vapour pressure at 20°C / 50°C	Negligible
Evaporation rate at 20°C	Not relevant *
Product Description	
Density at 20°C	Approx. 5.6 g/cm³
Dynamic / Kinematic viscosity	Non-applicable (solid)
Concentration	Min. 99.0% ZnO (industrial grade)
pH (aqueous suspension)	Approx. 7–8 (practically insoluble; slightly alkaline suspension)
Vapour density at 20°C	Not relevant *
Partition coefficient n-octanol/water 20°C	Not applicable (inorganic solid)
Solubility in water at 20°C	Practically insoluble (approx. 0.0016 g/L); soluble in dilute acids and alkalis
Decomposition temperature	Not relevant (thermally stable up to very high temperature)
Melting point/freezing point	Approx. 1975°C
Flammability	
Flash Point	Non-applicable (inorganic solid)
Flammability (solid, gas)	Non-combustible
Autoignition temperature	Not relevant *
Lower / Upper flammability limit	Not relevant *
Particle Characteristics	
Median equivalent diameter	Available on request (grade dependent – standard, active or micronised/nano grades differ significantly)

** Not relevant due to the nature of the product, not providing information on the properties of its hazards.*

Other information

Explosive properties	Not explosive
Oxidising properties	Not oxidising
Corrosive to metals	Not corrosive to metals under normal conditions
Heat of combustion	Not relevant (non-combustible)
Surface tension at 20°C	Not relevant *
Refraction index	Not relevant *

10. STABILITY AND REACTIVITY

Reactivity

Reacts with strong acids and strong bases (amphoteric oxide) to form zinc salts/zincates. No significant reactivity with water.

Chemical stability

Chemically stable under the indicated conditions of storage, handling and use.

Possibility of hazardous reactions

Under normal conditions, hazardous reactions are not expected. Reacts with strong reducing agents (e.g. magnesium, aluminium powder) with evolution of heat under specific conditions.

Conditions to avoid

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity
Not applicable	Not applicable	No particular effect below decomposition temperature	No particular effect	No particular effect

Incompatible materials

Strong Acids	Strong Bases	Reactive Metal Powders
Dissolves, forming zinc salts	Dissolves, forming zincates	Potential exothermic reaction under specific conditions

Hazardous decomposition products

None under normal conditions; zinc fume may be generated if heated to very high (molten metal) temperatures.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

Zinc oxide is of low acute toxicity. In case of exposure that is repetitive, prolonged, or at concentrations higher than the recommended occupational exposure limits, adverse health effects may result depending on the means of exposure:

A. Ingestion (acute effect)

Acute toxicity classification criteria are not met based on available data; large doses may cause gastrointestinal discomfort.

B. Inhalation (acute effect)

Not classified for acute inhalation toxicity. Inhalation of freshly generated fume (e.g. from heating/welding zinc-containing materials, not applicable to the solid product as supplied) is associated with metal fume fever, a self-limiting flu-like illness.

C. Contact with skin and eyes (acute effect)

Not classified as irritating to skin or eyes based on available data.

D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity)

Classification criteria for carcinogenicity, mutagenicity and reproductive toxicity are not met based on available data.

E. Sensitizing effects

Classification criteria for respiratory or skin sensitisation are not met based on available data.

F. Specific target organ toxicity (STOT) – single exposure

Classification criteria are not met based on available data; metal fume fever is a recognised effect of the fume form (see 11.1.B) but does not carry a harmonised STOT SE classification.

G. Specific target organ toxicity (STOT) – repeated exposure

Classification criteria are not met based on available data.

H. Aspiration hazard

Classification criteria are not met based on available data.

Product-specific toxicological information

Identification	Acute Toxicity	Genus
Zinc oxide CAS: 1314-13-2	LD50 oral: >5000 mg/kg	Rat
	LD50 dermal: >5000 mg/kg (estimated, low dermal absorption)	Rabbit

12. ECOLOGICAL INFORMATION

Very toxic to aquatic life with long lasting effects.

Toxicity

Acute Toxicity	Species	Genus
LC50: approx. 0.3–1.1 mg Zn/L (96h, literature range)	Non-applicable	Fish
EC50: approx. 0.1–1.0 mg Zn/L (48h, literature range)	Non-applicable	Crustacean (Daphnia)

Persistence and degradability

Not applicable in the classical sense (inorganic substance); zinc ion is persistent in the environment but speciation and bioavailability are strongly influenced by water chemistry (hardness, pH, organic matter).

Bioaccumulative potential

Zinc is an essential trace element and is subject to homeostatic regulation in most organisms; bioaccumulation is limited under normal conditions but can occur at elevated exposure.

Mobility in soil

Koc	Henry	Dry Soil	Moist Soil
Variable (soil-chemistry dependent)	Not relevant	Low mobility (mostly retained)	Moderate mobility, pH dependent

Results of PBT and vPvB assessment

Non-applicable (inorganic substance; PBT/vPvB criteria are designed for organic substances)

Other adverse effects

Not described

13. DISPOSAL CONSIDERATIONS

Disposal methods

Recover for reuse where possible. Dispose of via a licensed hazardous waste contractor in accordance with local regulations; avoid discharge to water bodies. Packaging that has contained the product should be emptied completely before disposal or recycling.

Refer to national and local regulations on waste management.

14. TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR 2023 / RID 2023)

14.1 UN number	Not assigned
14.2 UN proper shipping name	Non-hazardous for transport under ADR/RID
14.3 Transport hazard class(es)	Not classified
14.4 Packing group	N/A
14.5 Environmental hazard	Yes (Environmentally Hazardous Substance, aquatic)
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by sea (IMDG 41-22)

14.1 UN number	Not assigned
14.2 UN proper shipping name	Non-hazardous for transport under IMDG
14.3 Transport hazard class(es)	Not classified
14.4 Packing group	N/A
14.5 Marine pollutant	Yes
14.6 Special precautions for user	Non-applicable
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by air (IATA/ICAO 2024)

14.1 UN number	Not assigned
14.2 UN proper shipping name	Non-hazardous for transport under IATA/ICAO
14.3 Transport hazard class(es)	Not classified
14.4 Packing group	N/A
14.5 Environmental hazard	Yes
14.6 Special precautions for user	Non-applicable
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

15. REGULATORY INFORMATION

Safety, health and environmental regulations specific for the product in question

It is recommended to use the information included in this safety data sheet as data used in a risk evaluation of local circumstances, in order to establish the necessary risk prevention measures for the manipulation, use, storage and disposal of this product.

Other legislation

The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987)
Water (Prevention and Control of Pollution) Act, 1974

16. OTHER INFORMATION

Legislation related to safety data sheets

This safety data sheet has been designed in accordance with Annex 4 – Guidance on the preparation of Safety Data Sheets of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Texts of the legislative phrases mentioned in sections 2 and 3

H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects.

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3.

Advice related to training

Minimal training is recommended to prevent industrial risks for staff using this product, in order to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources

Publicly available GHS classification and physical/toxicological reference data for CAS 1314-13-2.

Abbreviations and acronyms

ADR: European agreement concerning the international carriage of dangerous goods by road | IMDG: International maritime dangerous goods code | IATA: International Air Transport Association | ICAO: International Civil Aviation Organisation | LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50 | Koc: Partition coefficient of organic carbon | PBT: Persistent, Bioaccumulative, Toxic | vPvB: very Persistent, very Bioaccumulative

Disclaimer: The information contained in this safety data sheet is based on sources, technical knowledge and current legislation, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product; it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within Suraj Chemicals' awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

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