



CHEMICAL PRODUCT SAFETY DATA SHEET ZINC OXIDE UN 3077

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	1 of 11

SECTION I — IDENTIFICATION OF THE HAZARDOUS CHEMICAL SUBSTANCE

1) Chemical name	2) Other means of identification	3) Recommended use of the substance
Zinc oxide	None known	Industrial use
4) Supplier / manufacturer information		5) SETIQ Emergency Numbers
Azinsa Oxidos, S.A. de C.V. Fernando Montes de Oca St. 21, Bldg. B, Fl. 2, San Nicolas Tlalnepantla, Estado de México Zip code 54030		55 59 15 88 (CDMX); 01 (800) 00 214 (In the country) Available 24 hours a day, 365 days a year. Provides technical and specific information for emergency and incident response.

SECTION II — HAZARD IDENTIFICATION

1) Classification of the hazardous chemical substance		
Physical hazards Not classified as flammable or explosive.	Health hazards Not classified as having significant acute toxicity; dust may cause mechanical irritation .	Environmental hazards Chronic hazard to aquatic environments — Category 2 .
2) Label elements (including precautionary statements and pictograms)		
Pictograms 	Warning word: Warning Hazard statements: H400: Very toxic to aquatic life H410: Very toxic to aquatic life with long-lasting effects Precautionary statements: P273: Avoid release to the environment. P391: Collect spillage. P501: Dispose of contents/container in accordance with local regulations	

3) Other hazards not contributing to classification

Fine zinc oxide dust may cause mechanical irritation to eyes, skin, and respiratory tract, especially during prolonged exposure or in poorly ventilated environments.

Repeated exposure to high concentrations of airborne dust may cause respiratory discomfort even though the material is not classified as toxic by inhalation under GHS.

No severe chronic effects are known under normal industrial use; however, it is recommended to avoid the generation and accumulation of dust.

SECTION III — COMPOSITION / INFORMATION ON COMPONENTS

Substance Identification	CAS No.	UN No.	EC No.	Concentration (% w/w)
Óxido de Zinc (ZnO)	1314-13-2	3077	215-222-5	70 – 100%



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	2 of 11

SECTION IV — FIRST-AID MEASURES

1) Description of first-aid measures

Inhalation	Move the affected person to fresh air. If symptoms persist, seek medical attention.
Ingestion	Do <i>not</i> induce vomiting. Consult a physician if discomfort occurs.
Skin contact	Wash thoroughly with water and soap. Remove contaminated clothing.
Eye contact	Rinse with plenty of water for several minutes.

2) Most important symptoms and effects, both acute and delayed

Agude effects	Inhalation may cause irritation of the upper respiratory tract. Overexposure may lead to irritation of mucous membranes, mouth and throat irritation, headache, fever, nausea, and dizziness. Skin and eye contact may cause irritation.
Chronic effects	None identified

3) Indication of immediate medical attention and special treatment needed

- Treat symptomatically
- If metal fumes are inhaled, keep the patient under medical observation.
- No specific antidote or treatment is available.

SECTION V — FIRE-FIGHTING MEASURES

1) Suitable extinguishing media

1) Appropriate extinguishing media

Use extinguishing agents suitable for the combustible materials present in the fire area, such as:

- Water spray
- Foam
- Carbon dioxide (CO₂)
- Dry chemical powder

Zinc oxide is not flammable, therefore the selection of extinguishing media depends on surrounding materials.

2) Specific hazards arising from the substance or mixture

Zinc oxide **does not present fire or explosion hazards.**

However, in the event of a surrounding fire, intense heating may generate:

- **Metal fumes,**
- **Metal oxides,**
which can be **irritating and harmful if inhaled.**

Inhalation of such fumes may cause **metal fume fever.**

Avoid dispersion of the material as dust during fire-fighting.

3) Special protective equipment and precautions for fire-fighters

- Wear full protective firefighting equipment.
- Use self-contained breathing apparatus (SCBA) when smoke or poor ventilation is present.
- Cool containers exposed to fire with water spray to prevent damage or rupture.
- Prevent runoff of firefighting water or residues from entering the environment.



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	3 of 11

SECTION VI — ACCIDENTAL RELEASE MEASURES

1) Personal precautions, protective equipment and emergency procedures

- Do not perform any action that involves personal risk or without appropriate training.
- Evacuate the surrounding area.
- Do not allow unprotected or unnecessary personnel to enter the affected zone.
- Do not touch or walk on the spilled material.
- Ensure adequate ventilation.
- Do not breathe dust.
- Wear appropriate respiratory protective equipment when ventilation is insufficient.

2) Environmental precautions

Avoid the dispersion of spilled material and prevent it from entering:

- Soil
- Waterways
- Drainage systems
- Sewers

Notify the corresponding authorities if the product has caused environmental contamination (waterways, soil, drainage system, or air).

3) Methods and materials for containment and cleaning up

- Collect the spilled material **dry**, using methods that **minimize dust generation** (e.g., gentle sweeping or industrial vacuum with an appropriate filter).
- Place the collected material in **suitable, labeled, and sealed containers** for final disposal.
- Clean the affected area carefully and avoid the use of compressed air.
- Dispose of waste in accordance with applicable environmental and waste regulations.

SECTION VII — HANDLING AND STORAGE

1) Precautions for safe handling

- Handle the product in **well-ventilated areas** to minimize exposure to dust.
- Avoid **inhaling dust** and avoid **skin and eye contact**.
- Do not eat, drink, or smoke while handling the product.
- Avoid generating dust during all operations; use handling techniques that reduce dispersion.
- Wash hands and exposed areas after handling.
- Do not mix with incompatible materials.
- Use **personal protective equipment (PPE)** as indicated in **Section 8**.

2) Conditions for safe storage, including any incompatibilities

- Store in **closed, properly labeled, and undamaged containers**.
- Keep the product in a **dry, cool, and well-ventilated place**, protected from moisture.
- Avoid accumulation of dust and avoid the presence of ignition sources, even though the material is **not flammable**.
- Keep away from **strong acids** or other chemicals that may react with metal oxides.
Store in accordance with **local regulations and internal safety guidelines**.



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	4 of 11

SECTION VIII — EXPOSURE CONTROLS / PERSONAL PROTECTION

1) Control parameters

Occupational exposure limits:

Inhalable dust: 5 mg/m³ (STEL/PEL according to NOM-010-STPS-2014 for metal oxide dusts).

Respirable particles: 10 mg/m³ (same regulatory source)

No specific limits are available for **zinc oxide vapors**, as the product is not volatile at room temperature.

Environmental monitoring:

For operations generating dust, occupational air monitoring is recommended to ensure levels remain below permissible limits.

2) Appropriate engineering controls

- Use **adequate general ventilation**, and for fine dust, use **local exhaust ventilation**
- Maintain the work area clean using methods that **minimize dust dispersion**; avoid using compressed air
- Provide eyewash stations and safety showers in handling areas.

3) Individual protection measures / Personal Protective Equipment (PPE)

Respiratory protection	For fine dust, use PFF2 or N95 respirators, or self-contained breathing apparatus if dust concentration exceeds permissible limits.
Hand protection	Chemical-resistant gloves (e.g., nitrile) when handling product directly.
Eye protection	Closed safety goggles or face shields to prevent contact with dust.
Skin and body protection	Long-sleeved work clothing and closed footwear. Apron or lab coat if prolonged contact is expected.

SECTION IX — PHYSICAL AND CHEMICAL PROPERTIES

1) Appearance (physical state and color):	2) Odor	3) Odor threshold	4) pH
White powder	Odorless	Not available	7.5 (aqueous suspension)
5) Melting point / Freezing point:	6) Initial boiling point and boiling range	7) Flash point	8) Evaporation rate
Melting : 1975 °C Freezing: Not available	Not applicable	Not applicable (non-flammable)	Not applicable
9) Flammability (solid or gas):	10) Upper/lower flammability or explosive limits	11) Vapor pressure	12) Vapor density
Not applicable	Upper limit: Not applicable Lower limit: Not applicable	Not applicable	Not applicable
13) Relative density (bulk density)	14) Solubility(ies)	15) Partition coefficient (n-octanol/water):	16) Auto-ignition temperature
4.0 – 6.0 g/in ³	In water: Negligible	Not available	Not applicable
17) Decomposition temperatura:	18) Viscosity:	19) Molecular weight	20) Other relevant information



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	5 of 11

Not applicable	Not applicable (solid material)	81.37 g/mol	None
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SECTION X — STABILITY AND REACTIVITY

1) Reactivity	Zinc oxide is stable under normal temperature and pressure conditions. It does not present hazardous reactivity during usual handling or storage. It may react with strong acids , producing zinc salts and water.
2) Chemical stability	The product is chemically stable under normal use conditions. No hazardous polymerization is expected. It does not decompose dangerously under normal conditions.
3) Possibility of hazardous reactions:	No hazardous reactions are expected under normal use. Avoid contact with strong acids and strong oxidizing agents . The product is neither flammable nor explosive .
4) Incompatible materials:	Strong acids Strong oxidizing agents
5) Conditions to avoid:	Exposure to high temperatures Excessive dust generation Excessive humidity, which may affect product handling
6) Hazardous decomposition products	None identified.

SECTION XI — TOXICOLOGICAL INFORMATION

1) Likely routes of exposure
<ul style="list-style-type: none">• Inhalation: Dust or fumes (especially when heating or mixing) may irritate the respiratory tract and can induce metal fume fever.• Skin and eye contact: May cause local irritation when exposure is prolonged or when concentrations are high.• Ingestion: Ingestion of large amounts may result in gastrointestinal effects.
2) Symptoms related to physical, chemical, and toxicological characteristics
<ul style="list-style-type: none">• Inhalation: Respiratory irritation, coughing, chest pain, headache, fever, and symptoms consistent with metal fume fever, typically appearing 4–12 hours after exposure• Ingestion: Nausea, vomiting, abdominal pain, and diarrhea.• Skin and eyes: Possible irritation, redness, or tingling with significant exposure.
3) Immediate and delayed effects, including chronic effects from short- and long-term exposure
<ul style="list-style-type: none">• Immediate effects: Respiratory irritation and metal fume fever after intense exposure to dust or fumes.• Delayed effects: Symptoms of metal fume fever may begin hours after inhalation.• Chronic effects: Limited evidence suggests that repeated exposure to high concentrations of dust may cause persistent irritation or inflammation of the respiratory tract.
4) Numerical toxicity measures (such as acute toxicity estimates)



CHEMICAL PRODUCT SAFETY DATA SHEET ZINC OXIDE UN 3077

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	6 of 11

Values based on various safety data sources (may vary with the formulation):

- **Acute oral toxicity (LD₅₀, rat):** > 2000 mg/kg (some references report > 5000 mg/kg).
- **Acute inhalation toxicity (LC₅₀, rat, 4h):** > 2.5 mg/L (estimated).

These values indicate low general acute toxicity, although inhalation of freshly formed fumes causes characteristic respiratory effects.

5) Interactive effects

No strong evidence exists indicating specific synergistic toxic effects with other chemicals under normal use conditions, However:

- Formation of **fumes when heating zinc or zinc oxide** increases the risk of *metal fume fever*.
- Co-exposure to additional irritants or sensitizing agents may exacerbate respiratory responses.

(General toxicological assessment consistent with the original SDS.)

6) When specific data is not available

For long-term effects (carcinogenicity, mutagenicity, reproductive toxicity), no conclusive data exists demonstrating such effects in humans for zinc oxide.

Major agencies (IARC, NTP, OSHA) do **not** classify ZnO as a confirmed human carcinogen.

7) Mixtures

In mixtures where zinc oxide is combined with other materials (paints, additives, cosmetics), **toxicity also depends on those components and their interactions**. Consult the SDS for the specific mixture.

8) Information on the mixture or on its components

Zinc oxide by itself shows low acute oral or dermal toxicity, according to acute toxicity studies conducted on animals. Its main occupational toxicological risk is associated with the **inhalation of dust or fumes**, rather than severe systemic effects at low exposure levels.

9) Other information

Zinc oxide **is not consistently classified as a human carcinogen** by major authorities (IARC, NTP, OSHA).

Metal fume fever is a well-documented condition associated with inhaling fresh ZnO fumes.

Zinc oxide is widely used in topical products (creams, sunscreens) and poses **minimal risk at low doses without significant inhalation exposure**.

SECTION XII — ECOLOGICAL INFORMATION

1) Toxicity

Result	Species	Exposure	Reference
Acute EC50 > 1000 mg/L (fresh water)	Fish – <i>Daphnia magna</i>	48 h	Environmental Fate and Effects, US EPA
Acute LC50 = 1.1 mg/L (fresh water)	Fish – <i>Oncorhynchus</i> spp.	96 h	Environmental Fate and Effects, US EPA
Acute LC50 > 320 mg/L (fresh water)	Fish – <i>Lepomis macrochirus</i>	96 h	Environmental Fate and Effects, US EPA
Acute NOEC = 0.026–0.075 mg/L (fresh water)	Fish – <i>Jordanella floridae</i>	720 h	IUCLID 5
Acute LC50 = 0.136 mg/L (fresh water)	Aquatic plants	72 h	Environmental Fate and Effects, US EPA



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	7 of 11

2) Persistence and degradability

Zinc oxide is an **inorganic substance**.

It is **not biodegradable** in the conventional sense.

It may **persist in the environment** and be slowly transformed into other zinc chemical forms.

In aquatic environments, it may partially dissolve and release zinc ions, which are more bioavailable and potentially toxic.

3) Bioaccumulative potential

Zinc oxide does **not present a high bioaccumulation potential** in living organisms.

Zinc is an **essential element** for many organisms; however:

- At elevated concentrations, it may cause toxic effects.
- Biological mechanisms regulate its absorption and excretion.

Under normal industrial use conditions, zinc oxide is **not considered bioaccumulative** in the food chain

4) Mobility in soil

The mobility of zinc oxide in soil is **limited to moderate**.

It may:

- Adsorb to soil particles and sediments.
- Migrate slowly depending on soil pH, organic matter content, and environmental conditions.
- In acidic soils, the mobility and availability of zinc may increase

5) Other adverse effects

Uncontrolled releases or spills may:

- Cause **negative impacts on aquatic ecosystems**.
- Affect soil microbial activity.

No additional significant adverse effects are known beyond those related to zinc toxicity at elevated concentrations.

6) Additional information

- Zinc oxide is not classified as a Persistent Organic Pollutant (POP).
- It is not expected to cause ozone layer depletion.
- Release to the environment should be avoided, particularly into water bodies, and residues should be managed in accordance with applicable environmental legislation.

SECTION XIII — DISPOSAL CONSIDERATIONS

1) Waste treatment methods

- Zinc oxide must be disposed of in accordance with applicable environmental legislation and the requirements established by the competent authorities.
- It must not be disposed of as household waste nor discharged into drains, water bodies, or soil.
- Solid waste generated should be:
 - Collected in properly labeled, closed, and compatible containers.
 - Sent to an authorized waste management company for treatment, recycling, or final disposal.
 - Whenever possible, recovery or recycling of the material is recommended, particularly for industrial applications.

2) Disposal of contaminated packaging

- Containers that have held zinc oxide may retain product residues.

Empty containers should:

- Be completely emptied.
- Be handled as **industrial waste** if contaminated.



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	8 of 11

- **Not be reused** for other purposes.
 - Final disposal of packaging shall be carried out in accordance with applicable environmental regulations and authorized waste management procedures.
- 3) Special disposal precautions**
- Avoid generation and dispersion of dust during waste collection and handling.
 - Use appropriate personal protective equipment (gloves, respiratory protection, and eye protection).
 - Prevent release of the product into the environment, especially into water bodies, due to its toxicity to aquatic organisms. Implement appropriate cleaning procedures in the event of spills.
- 4) Recommendations related to safe disposal**
- Dispose of zinc oxide in accordance with applicable local, regional, and national environmental regulations.
 - Prevent its release into the environment, especially into water bodies and drainage systems.
 - Waste must be managed by an authorized industrial waste treatment and disposal provider, taking into account its potential effects on aquatic organisms.
- 5) Additional information**
- Zinc oxide is a chemically stable inorganic substance; however, improper disposal may result in environmental impacts.
 - Final disposal must be carried out **only by authorized companies**.
 - In case of uncertainty regarding waste classification, consultation with the competent environmental authority is recommended.

SECTION XIV — TRANSPORT INFORMATION

- 1) UN number**
- 3077**
- 2) UN proper shipping name**
- ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide)
- 3) Transport hazard class(es)**
- Class 9 — Miscellaneous dangerous substances and articles
- 

**Miscellaneous dangerous substances and articles
(Zinc Oxide)**
- 4) Packing group**
- Grupo de embalaje III** (Substance presenting **minor danger** during transport)
- **ADR / RID:** *Special provision 274*
 - **IMDG:** *Special provision 274*
 - **IATA:** *Special provision A97*
- (The technical designation "zinc oxide" must be indicated in parentheses.)*
- Land transport (ADR / RID / applicable NOM)**



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	9 of 11

- **Classification:** UN 3077, Class 9, Packing Group III
- **Classification code:** M7
- **Hazard identification number:** 9
- **Labeling:** Class 9 + environmentally hazardous mark
- **Limited quantities:** Permitted under specific conditions
- **Packing instruction:** P002

Sea transport (IMDG)

- UN: 3077
- Class: 9
- Packing instruction: P002
- Packing group: III
- Marine pollutant: **Yes**
- EmS: F-A, S-F
- Stowage: In accordance with IMDG Code

Air transport (IATA)

- UN: 3077
- Class: 9
- Packing group: III
- Packing instructions: 956 (cargo) / 956 (passenger, when applicable) / Y956 (limited quantities)
- Restrictions: Must comply with IATA limits and approved packaging

Although the material is stable, its UN 3077 classification requires:

- Environmental labeling.
- Strict spill control.

Failure to comply with transport requirements may result in administrative and environmental penalties

5) Environmental hazards

- Classified as **environmentally hazardous**, particularly toxic to aquatic organisms.
- May cause long-term adverse effects in the aquatic environment if released in an uncontrolled manner.
- Transport labels:



Hazardous substance for the aquatic environment

6) Special precautions for user



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	10 of 11

Avoid dispersion of dust during loading and unloading operations.

Transport only in:

- Closed, resistant, and properly labeled containers.
- Packaging approved in accordance with applicable transport regulations.

Do not allow the product to:

- Come into contact with bodies of water.
- Be released into the environment in case of an accident.

Personnel involved in transport must:

- Be properly trained.
- Use appropriate personal protective equipment according to the risk involved

7) Transport in bulk in accordance with Annex II of MARPOL 73/78 and the IBC Code

Zinc oxide is a solid substance and is not subject to bulk transport regulations for liquids under Annex II of MARPOL 73/78 or the IBC Code.

SECTION XV — REGULATORY INFORMATION

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

European Union (EU)

- This substance is subject to **Regulation (EC) No. 1907/2006 (REACH)**.
- Classification and labeling are carried out in accordance with **Regulation (EC) No. 1272/2008 (CLP)**.
- Zinc oxide is classified as **hazardous to the aquatic environment**.

United States

- Listed on the **TSCA Inventory**.
- Considered environmentally hazardous according to **EPA** criteria.
- May generate toxic metal fumes when heated, as referenced by **OSHA**.

Mexico

- In accordance with **NOM-018-STPS-2015** (Globally Harmonized System for the classification and communication of chemical hazards).
- Requirements regarding hazard communication and occupational exposure control apply.
- **Other regulations:**
Complies with the **Globally Harmonized System (GHS/SGA)** for classification and labeling of chemicals.

Chemical safety assessment

A chemical safety assessment **has not been carried out** for this substance.



**CHEMICAL PRODUCT
SAFETY DATA SHEET
ZINC OXIDE UN 3077**

Code:	HSOZ3077
Revision:	6
Revision date:	January, 2026
Pages:	11 of 11

SECTION XVI — OTHER INFORMATION

The information contained in this Safety Data Sheet is considered accurate and is based on the current state of available knowledge regarding zinc oxide at the date of its preparation. However, **no guarantee, expressed or implied, is made as to its accuracy or completeness.**

This information is provided solely as a guide for the **handling, storage, use, exposure control, and final disposal** of the product and shall not be considered as a quality specification nor as a basis for any contractual relationship.

The user is responsible for ensuring compliance with all applicable **safety, health, and environmental regulations**, including those established in **NOM-018-STPS-2015** and all other effective regulations in Mexico.