SAFETY DATA SHEET

Revision Date: 01/11/2024

1. Identity of material and supplier

Product name	:	Zinc oxide (ZnO)
Recommended use	:	Industrial etc :
		Rubber compound
		Coloring agents, pigments Food/feedstuff additives Fuels and fuel additives Intermediates
		Laboratory chemicals
		Lubricants and lubricant additives
		Plating agents and metal surface treating agents
		Process regulators, other than polymerization or vulcanization processes
		Component in batteries
		Corrosion inhibitors and anti-scaling agents
		Fertilizers
		Pharmaceutical substance
		Photosensitive agents and other photo-chemicals
		Process regulators, used in vulcanization or polymerization processes
		Processing aid, not otherwise listed
		Semiconductor
		No uses advised against
Chemical formula	:	ZnO
Phyisical form of product	:	Powder/Granular

2. Hazards identification

GHS Classication

Acute aquatic toxicity, Category 1	:	H400: Very toxic to aquatic life
Chronic aquatic toxicity, Catergory 1	:	H410: Very toxic to aquatic life with long lasting effects

Environmental hazard	:	R50/53: Very toxic to aquatic organisms that may cause long term adverse effects.
Precautionary	:	P273: Avoid release to the environment. P391: Collect spillage
Other hazards	:	None

Adverse human health effects

- Inhalation	:	May cause irrtation to the respitory tract

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- Skin contact	:	Repeated or prolong skin contact may cause irritation
- Eye contact	:	Excessive dust exposure may cause minor eyes irritation
- Ingestion	:	Health hazard if ingested in large quantity may cause abdominal pain, nausea cramps.

3. Composition and information on ingredients

Substance name	:	Zinc oxide
Content	:	> 99.5%
CAS No.	:	1314-13-2
EINECS No.	:	215-222-5
Additional information of impurities	:	Contains naturally occurring inorganic impurities less than SDS reporting de minimis. Product may contain processing aid at customer request. After manufacturing, during material handling and storage, the hygroscopic ZnO product absorbs some moisture from humidity in air, and product also slowly degrades with CO2 in air forming zinc carbonate.

4. First aid measures

Effects and symptoms	:	No specific effects and/or symptons have been reported or known.
4.1 Description of first aid measures:		
In case of skin contact	:	Wash with soap and water.
In case of eye contact	:	Rinse with plenty of water and seek medical advice.
In case of Ingestion	:	Drink plenty of water; do not induce vomiting; call a physician
In case of Inhalation	:	Move to fresh air. Keep warm and at rest.
4.2 Most important symptoms and effects, both acute and delayed:		
Acute	:	Dry cough, headache.
Chronic	:	None (overexposure has no lasting effects).
4.3 Indication of any immediate medical attention and special treatment needed	:	Bad cough or headache. Move person to fresh air. No special treatment known. Excess dust must naturally purge or absorb.
Notes	:	If victim still feeling unwell seek medical attention immediately

5. Fire fighting measures

Zinc oxide will not burn.

Hazardous decomposition product(s) : None.

Use extinguishing media appropriate for the surrounding fire.

Avoid release of fire control water containing zinc oxide to the environment.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:	:	Wear protective clothing, dust respirator, and goggles in bulk excess dust conditions. Shovel up spills into appropriate labeled container. Dry spills, not mixed with other chemicals, may be recyclable. Contact PT. Indo Lysaght
6.2 Environmental precautions	:	Avoid release to the environment.
6.3 Methods and material for containment and cleaning up:	:	Recover the product by vacuum., If sweeping unavoidable, use soft bristles to reduce creation of airborne dust.

7. Handling and storage

7.1 Precautions for safe handling	:	Wear protective clothing, dust respirator, and goggles in bulk excess dust conditions.
7.2 Conditions for safe storage, including any incompatibilities	:	Keep dry. Germany TRGS 510 Annex 4, Class 13 Non-combustible solids that cannot be assigned to other storage class

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8. Exposure controls/personal protection

8.1 Exposure controls/Personal protection:

Route(s) Of Entry	:	1. Inhalation. 2. Dermal. 3. Eyes. 4. Digestion.
Eye protection	:	Recommend safety glasses in bulk dusk conditions.
Protection for skin	:	Recommend long sleeves in bulk dust conditions.
Protection for hands	:	Recommend gloves to reduce drying of skin
Respiratory protection	:	Recommend dust filter mask in bulk dust conditions. (Must wear respirator of proper type if exposure above 8 hour TWA)
- OSHA Permissible Exposure Limit (PEL)	:	fume 5 mg/m3 (TWA) respirable fraction 5 mg/m3 (TWA) total dusts 15 mg/m3 (TWA)
8.1.1 Appropriate engineering controls	:	Technical conditions and measures at process level (source) to prevent release: Process enclosures closed circuits or semi-enclosures where appropriate. Local exhaust ventilation with potential dust and fumes generation. Containment of liquid volumes in sumps to collect/prevent accidental spillage.
Technical conditions and measures to control dispersion from source towards the worker	:	Cyclones/filters to minimize dust emissions. Good general housekeeping and maintenance practices.
Organizational measures to prevent /limit releases, dispersion and exposure	:	Management system (i.e. ISO9001 or ISO 45001) for good work, training, cleaning, PPE and hygiene practices.

8.1.2. Environmental exposure control

Technical conditions and measures at process level (source) to prevent release	:	Process enclosures and closed circuits where relevant and possible. Local exhaust ventilation with potential dust generation, dust capturing and removal techniques Containment of liquid volumes in sumps to collect/prevent accidental spillage.
Technical onsite conditions and measures to reduce discharges, air emissions and releases to soil	:	On-site waste water treatment techniques.

Containment of liquid volumes in sumps to collect/prevent accidental spillage

Air emissions are controlled by use of bag-house filters or other air emission abatement devices.

Organizational measures to prevent/limit release from site:	:	Management system (i.e. ISO9001 or ISO 45001) for good work, training, cleaning, PPE

9. Physical and chemical properties

Physical state	:	Powder
Appearance	:	White to off-white
Odour	:	Odourless
pH value	:	7 - 8 (suspension - water)
Molecular weight	:	81.38
Melting point	:	Will not freeze. Will not melt.* Malleable above 300C/572F No exothermic or endothermic peaks are observed. No oxidation or decomposition was observed. Sublimation temperature 1975C.
Boiling point	:	Not applicable; the substance decomposes before boiling.
Flash point	:	Not applicable to inorganic substances.
Evaporation rate	:	Not applicable to solids

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Flammability	: Not flammable. Will not burn.
Auto-ignition temperature:	: The substance is not auto-flammable.
Upper / lower flammability limits:	: Not applicable.
Upper / lower explosive limits:	: Not applicable.
Vapour pressure:	: Not applicable (melting point above 300°C).
Vapour density:	: Not applicable.
Relative density/Specific Gravity:	: 5.68 g/cm3.
Water solubility	: Negligible (solubility of Zn in ZnO is 2.9 mg/l).
Solubility in other ingredients	: Negligible (organic substances). Soluble in acids and bases
Partition coefficient n-octanol-water	: Not applicable to inorganic substance
Decomposition temperature	: Not applicable

10. Stability and reactivity

Reactivity:	: Stable under normal dry air conditions.
Chemical stability:	: Product is stable.
Possibility of hazardous reactions:	: None
Conditions to avoid	: Keep from getting wet (will damage substance usefulness).
Incompatible materials	: Heated magnesium. Chlorinated rubber above 215C.
Hazardous decomposition:	: None.
Decomposition:	: Product decomposes in acids and bases.

11. Toxicological information

Acute toxicity	
- Inhalation	: (rat) 4 hours LC50 > 5.7 mg ZnO/l Klimisch and Freisberg (1982
- Dermal	: No data Available
- Ingestion	: (rat) LD50 > 15000 mg ZnO/kg OECD 401
Dermal irritation (rabbit)	: Not irritant. OECD 404
Eyes irritation (rabbit)	: Not irritant. OECD 405
Chronic toxicity	: 50 mg ZnO/day

*With LD_{50} values consistently exceeding 2,000 mg/kg bw, slightly soluble compounds such as, zinc oxide (LD_{50} ranges between 5,000 and 15,000mg/kg bw) show low level of acute oral toxicity, not leading to classification for acute oral toxicity. Zinc oxide is shown to be of low acute inhalation toxicity (i.e., LC50 values of > 5.7 mg/L/4hrs), not leading to classification for acute inhalation toxicity.

Route(s) Of Entry	: 1. Inhalation. 2. Dermal. 3. Eyes. 4. Digestion.
Irritation/Corrosion	:
Skin	: Not irritant.
Eye	: Not irritant.
Respiratory tract	: Not irritant
Ingestion	: None (zinc oxide is used as a human vitamin supplement).
Sensitization	: No sensitizing effects known (Van Huygevoort, 1999 g, h)
Germ cell mutagenicity	: No biologically relevant genotoxic activity.
Carcinogenicity	: Not a NTP/IARC carcinogen.
Reproductive toxicity	: No evidence of reproduction toxicity.
Specific target organ toxicity (single exposure):	No experimental or epidemiological sufficient evidence for specific target organ toxicity

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Specific target organ toxicity	:	Specific target organ toxicity (repeated exposure): None. (Lam et al, 1985, 1988; Conner et al. 1988).
Specific target organ toxicity (single exposure)	:	None. (Heydon and Kagan, 1990; Gordon et al., 1992; Mueller and Seger, 1985).

12. Ecological information

12.1 Toxicity	:	Zinc oxide is not an acute oral or acute inhalation toxic.
12.1.1. Acute aquatic toxicity	:	Acute EC50 0.413 mg/l Zn, 48 hour – Ceriodaphnia dubia
	:	Acute LC50 0.136 mg/l Zn, 72 hour – Selenastrum capricornutum

12.2. Persistence and biodegradability – Not Applicable (zinc is an element).

12.3. Bioaccumulative potential – Not Applicable (ZnO does not bioaccumulate or biomagnify).

Zinc is a natural essential element necessary for optimal growth and development of all living organisms, including man. All living organisms have homeostasis mechanisms that actively regulate zinc uptake and absorption/excretion from the body; due to this regulation, zinc and zinc compounds do not bioaccumulate or biomagnify.

12.4. Mobility in soils – Not Applicable. For zinc (like for other metals) the transport and distribution over the different environmental compartments e.g. the water (dissolved fraction, fraction bound to suspended matter), soil (fraction bound or complexed to the soil particles, fraction in the soil pore water,...) is described and quantified by the metal partition coefficients between these different fractions.

12.5. Results of PBT and vPvB assessment – Not Applicable (zinc oxide is not PBT or vPvB)

12.6 Other adverse effects – None.

13. Disposal considerations

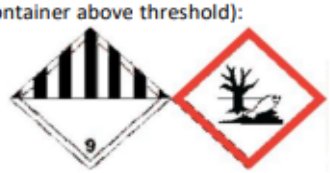
Disposal	:	Comply with the local regulations for disposal
Waste of residues	:	S60: This material and its container must be disposed of as hazardous waste
Contaminated packaging	:	Keep waste packaging separate.

14. Transport information

This material is not transportation regulated in the U.S.A.

Table for transportation information within P.R.C., Japan, Republic of Korea, and where transportation authorities regulate zinc oxide as transportation Class 9 (if net wt. per container above threshold):

Labelling ADR :



UN No.	:	3077
Proper Shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCES, SOLID, N.O.S. (Zinc Oxide)
IMDG-Marine pollution	:	Yes
EU RID, ADR rail & road Hazard Identification Number (HIN)	:	90
Hazard identification number	:	9
Packing group	:	III
Environmental hazards	:	Dangerous to the Environment
Additional information	:	Tunnel code (E)
Special precautions for users (general)	:	None

IATA:

IATA - Passenger & Cargo Aircraft	1000 kg (Packing Instruction 956 for IBC's)
IATA - Passenger & Cargo Aircraft	400 kg (Packing Instruction 956 for Bags)
IATA - Passenger & Cargo Aircraft	30 kg (Packing Instruction Y956 for Limited Quantity)
IATA - S.P	A97, A158, A179

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15. Regulatory information

15.1 Globally Hardmonized System of classification and Labelling of Cchemicals (GHS)

REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

Hazard class and category code

- Environmental hazards : Hazardous to the aquatic environment - Acute hazard - Category 1 - Warning (CLP : Aquatic Acute 1)
  : Hazardous to the aquatic environment - Chronic hazard - Category 1 - Warning (CLP : Aquatic Chronic 1)

Labelling

- Hazard pictograms :

- Signal words : Warning
- Hazard statements : H410: Very toxic to aquatic life with long lasting effects
- Precautionary statements
  - Prevention : P273 : Avoid release to the environment
  - Response : P391 : Collect Spillage
  - Disposal considerations : P501 : Dispose of this material and its container to hazardous or special waste collect point, in accordance with local, regional and/or international regulation.

EC Labelling

EC classification : N; R50/53

Symbol(s) :

R Phrase(s) : R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S Phrase(s) : S60 : This material and its container must be disposed of as hazardous waste.

S61 : Avoid release to the environment. Refer to special instructions/Safety date sheets

15.2 SVHC: Zinc oxide is not an SVHC. Impurities are below SVHC or candidate SVHC thresholds.

15.3 Food Contact.

- P.R.C.: complies with GB 9685-2008 and is listed on food colorant MoH Positive List for Additives.
- EU: Listed EC 10/2011, compliant with EC 1935/2004, is GMP EC 2023/2006 (SML is 25 mg/kg as Zn).
- US: Listed as a GRAS (Generally Recognized As Safe) at 21CFR182.8991.
- Canada: Health Canada has issued a Letter of No Objection

15.4 Other.

- Halal (SJH), GMP, HACCP & EFfCI certified.
- zinc oxide is RoHS, and ELV compliant.
- Standard Nasional Indonesia (SNI) certified.
- REACH Registration Number 01-2119463881-32-0174
- Management System ISO 9001, ISO 14001, ISO 45001

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16. Other information including information on preparation and revision of the SDS

16.1 Product information : Registry Toxic number (RTECS/NIOSH)

16.2 Risk Phrases : R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

16.3 HMIS Hazard Rating (Paint and Coating Industry)

Health	: 1 (slight)
Flammability	: 0
Reactivity	: 0
Personal Protection	: E (mask, gloves, and goggles are recommended in bulk dust conditions)

16.4 This SDS provides information to work safety with ZnO substance. It is not a performance or property guarantee. The information is believed accurate utilizing reasonably available published data. We are not responsible for any inadvertent error or omission

16.5 Update revision of SDS : 01-Nov-23

end of document

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