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MATERIAL SAFETY DATE SHEET

ZINC OXIDE

Section 1-Identification of the Substance/Preparation/Company

Product Name : Zinc Oxide

Use : Feed, Ceramics, Tyres, Glass, Plastics, Pigments, Coatings, agriculture and Fertilizer, frits

Manufacturer : Pantheon FZE
JAFZA 17/329,
PO Box: 17899, Jabel Ali,
Dubai, UAE

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Section 2-Hazards Identification

Hazard Class and Category Codes (s)

Aquatic Acute 1
Aquatic Chronic 1

Hazard statement Codes (s)

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

Risk phrases

R50-53 : Very toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment

Safety phrases
S60 : This material and its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instruction/safety data sheet

Potential Health Effects

Inhalation: May cause breathing problems
Skin Contact: May cause skin corrosion/irritation

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Section 3-Composition/Information on Ingredients

CAS No : 1314-13-2

EC No : 215-222-5

Concentration : 100%

Section 4-First Aid Measure

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion: Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Wash out mouth with water and make affected person drink plenty of water. Get medical attention if symptoms appear.

Skin contact: Continued & thorough flushing with water is mandatory. Zinc oxide dust may give rise to eczema. Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Eye contact: Immediately flush eyes with plenty of water for 15-20 minutes. After initial flushing, remove any contact lenses and continue flushing. Get medical attention if irritation occurs. Get medical attention if irritation persists.

Section 5-Fire fighting procedure

Suitable extinguishing media: Use extinguishing media based on surroundings. These include water spray, carbon dioxide, dry chemical or foam.
Extinguishing media which shall not be used for safety reasons: Zinc oxide and Magnesium can react explosively when heated.
Special exposure hazards: May explode when mixed with chlorinated rubber
Special remarks on fire hazards: Slow addition of zinc oxide to cover linseed oil varnish causes generation of heat and ignition.
Special fire fighting procedure: Dike fire control water for later disposal

Section 6-Accidental Release Measure

Personal Precautions: Isolate spill area immediately. Keep unauthorized personnel away. Ventilate closed spaces before entering. Do not touch or walk through spilled material. Prevent entry into waterways, sewers, basements or confined areas. Surface may become slippery after spillage. Use vacuum or broom sweeping and remove to disposal container. If damp, flush with water. Wear suitable protective clothing and gloves (see section 8). Avoid dust generation.

Environmental Precautions: Keeping away from drains, surface-and ground-water and soil, possible need to alert the neighborhood, prevent dispersion. Do not allow to enter sewage system. Keep away from drains, surface and ground water. Avoid soil contamination.

Methods for cleaning up: Take up in shovels mechanically and collect in sealable containers. Recycling is recommended. Use of absorbent material (e.g. sand, diatomaceous earth, acid binder, universal binder, sawdust etc), reduction of gases/fumes with water, dilution.
Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill: Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow evacuating through the sanitary system.

Section 7-Handling and Storage

Handling: Keep locked up. Keep away from incompatibles such as acids. If ingested, seek medical advice immediately. In case of insufficient ventilation, wear suitable respiratory equipment. Wear suitable protective clothing. Do not ingest. Avoid contact with eyes. Wash thoroughly after handling. Use appropriate protection (See section 8). Avoid dust generation.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Avoid freezing or excessive heat. Usual precautions for nuisance of dust should be followed. Keep in a dry place in sealed container. Keep away from acids and bases. Keep in the original packaging.

Section 8-Exposure control/Personal protection

Exposure limit values

ACGIH : ACGIH has assigned zinc oxide a threshold limit value (TLV) of 10 mg/m(3) for total dust (containing no asbestos and <1% crystalline silica), as a TWA for a normal 8-hour workday and a 40-

hour workweek. The ACGIH has assigned a TLV-TWA of 5 mg/m(3) and a TLV-STEL of 10 mg/m(3) to zinc oxide fume [ACGIH 1994, p. 36].

NIOSH : NIOSH has established recommended exposure limits (RELs) for zinc oxide of 5 mg/m(3) for total dust as a TWA for up to a 10-hour workday and a 40-hour workweek and a 15 minute ceiling of 15 mg/m(3) [NIOSH 1992].

OSHA – Final PELs: Permissible exposure limit (PEL) for zinc oxide is 15 mg/m3 of air for total dust, and 5 mg/m3 for the respirable fraction as an 8-hour time-weighted average (TWA) concentration [29 CFR 1910.1000, Table Z-1].

Exposure controls

Engineering Controls: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operation generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Hygiene measures: Practice good personal hygiene procedures.

Respiratory Protection: Be sure to use NIOSH/OSHA-approved respirator. A self contained breathing apparatus should be used to avoid inhalation of the product. With sufficient extraction or closed system, breathing apparatus in necessary. If occupational exposure limits are exceeded, use dust filter P2.

Hand Protection: Be sure to use an approved/certified or equivalent glove. Material: leather gloves, cotton gloves, rubber gloves.

Eye protection: Safety glasses, goggles, or face shield recommended. Splash goggles in case of large spill

Skin protection: Wear lab coat. Full suit in case of large spill. Boots in case of large spills. Employees must practice good personal hygiene, washing exposed areas of skin several times daily and laundering contaminated clothing before re-use. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Indication of any additional skin protection measures and specific hygiene measures.

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Section 9-Physical Chemical Properties

Physical state	:	Powdered Solid
Color	:	White to yellowish-white, brown, light-brown
Odor	:	Odorless
Taste	:	Bitter
pH	:	7.0 +/- 0.50
Molecular weight	:	81.38 g/mole
Boiling point	:	2360 ^{o}C
Melting point	:	1975 ^{o}C
Specific gravity	:	5.5 - 5.7
Dispersion property	:	Is not dispersed in cold water, hot water
Solubility	:	Soluble in dilute acetic acid, or mineral acids, ammonia, ammonium carbonate, fixed alkali hydroxide solution.
Explosive property	:	Not explosive (VDI 2263)
Vapour pressure	:	Very low

Section 10-Stability and Reactivity

Stability : The product is stable if stored light-protected & sealed containers/bags.

Conditions to Avoid : Gradually absorbs Carbon dioxide on exposure to air. Sublimes at normal pressure. Avoid excessive heat, generating dust, direct sunlight, moisture and static discharges.

Materials to avoid : Reacts violently with magnesium, linseed oil. Reacts with hydrochloric acid to produce zinc chloride. Reacts with sulfuric acid to produce zinc sulfate. Reacts with hydrogen fluoride to produce zinc fluoride tetrahydrate. Zinc Oxide reacts with Carbon Monoxide or hydrogen to produce elemental zinc. Keep away from acids and bases.

Hazardous decomposition products: Toxic gases such as zinc oxide fumes may be released in a fire involving zinc oxide. Polymerization will not occur. Non-corrosive in presence of glass.

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Section 11-Toxicity Information

Acute effects (acute toxicity, irritation and corrosivity): Slightly hazardous in case of skin contact (irritant), of ingestion. May cause mild skin irritation (Hazardous Substances Data Bank – HSDB)

Acute Toxicity (Oral):
Oral LD50 (mice): 7950 mg/Kg [NIOSH 1991] (Data bank of Environmental Properties of Chemicals – EnviChem)
LC50 (mice): 2500 mg/m(3) [NIOSH 1991]

Type of test	Route of exposure	Species observed	Dose/duration	Details of toxic effects
LDL0 – Lowest published lethal value	Oral	Human	500 mg/kg (The dictionary of substances and their effects, Volume 7 By S. Gangolli, Royal Society of Chemistry (Great Britain)	Not reported other than lethal dose

TDLo values to mammals in oral exposure, mg/Kg: 6846 (Data bank of environmental properties of Chemicals – EnviChem)

Acute toxicity (Inhalation):
TCLo values to mammals in inhalation exposure, mg/kg: 600. (Data bank of Environmental properties of chemicals – EnviChem)
LD50 values to mammals in non-oral exposure mg/Kg: 240. (Data bank of Environmental properties of Chemicals – EnviChem)

Skin irritation:
Rabbit: 500 mg (24 hr) – mild irritant (Data bank of Environmental Properties of Chemicals – EnviChem)
Zinc oxide has low potential for skin irritation in the case of humans. Skin inflammation is characterized by itching, scaling, reddening and occasionally blistering.

Eye irritation:
Rabbit: 500 mg (24 hr) – mild irritant (Data bank of Environmental Properties of Chemicals – EnviChem)
Sensitisation: No sensitizing potential (guinea pig), (Magnusson & Klingman)

CRM effects (carcinogenicity, mutagenicity and toxicity for reporoduction)
Mutagenic effects: Zinc oxide is an experimental mutagen (The occupational Safety and Health Administration (OSHA)).

Reprotoxic effects: Zinc oxide can affect the reproductive system in experimental animals. (The Occupational safety and Health Administration (OSHA)).
Carcinogenic effects: No evidence of carcinogenicity in laboratory animals or in man. (HSDB)

Other Toxic effects on Humans:
Inhalation: May cause mechanical irritation of the respiratory tract. A few sources claim that finely divided zinc oxide dust can cause "metal fume fever." Zinc oxide dust is generally considered a nuisance dust; adverse effects are unlikely when exposures are kept under reasonable control. Inhalation of high concentrations of Zinc oxide fume or dust may cause "Metal Fume Fever." Symptoms if metal fume fever may include a flu-like condition involving headache, chills, fever, sweats, nausea, vomiting, cough, muscle aches and pains, and difficulty breathing; pulmonary edema. May also affect the liver.
Eyes: May cause mechanical eye irritation and conjunctivitis, redness or pain
Ingestion: May cause digestive tract irritation although Zinc oxide has a low toxicity by oral exposure route. Prolonged or repeated ingestion of zinc oxide may affect blood, metabolism, and the thyroid.
Chronic toxicity: Studies in animals indicate that doses as high as 200 mg/kg have caused reduced fatal body weight and fetal death.

NIOSH Immediately Dangerous to life or health concentration (IDLH) : 500 mg/m3

Section 12-Ecological Information

Ecotoxicity:

Species	Type of Exposure	Duration	End point	Value
Daphnia magna	Static	48 hr	LC 50	98 ug/l (=0.098 mg/l) (As per HSNO CCID)
Algae			EC 50	0.03 mg/l (As per HSNO CCID)
Colinas Virginians			LD 50	566 mg/kg (As per HSNO CCID)
Rice fish (Oryzias latipes)		48 hr	LC 50	> 20.0 mg/l (As per CHRIP)

Mobility: Not applicable
Rapidly Degradable: No
Bioconcetration: Low bio-concentration
Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the products of Biodegradation: The product itself and its products of degradation are not toxic.

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Section 13-Disposal Considerations

Methods of disposal: Disposal according to national/regional regulation.
Waste of residues: Keep waste separate. Because of possible pollution, remove as industrial waste or hazardous waste (EWC code 060316).
Contaminated packaging: Keep waste packaging separate. Because of possible pollution, remove as industrial waste or hazardous waste (EWC-Code 150110).
Waste Disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations.
Spillage Disposal: Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, and then remove to safe place.
Personal protection: P2 filter respirator for harmful particles.

Section 14-Transport Information

UN number	3077
Class	9 – Miscellaneous hazardous material
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S
Packaging group	II
Marine Pollutant	Yes
Pictogram	

Section 15-Regulatory Information

Classification and Labelling according to REGULATION (EC) No 1272/2008 OF EUROPEAN PARLIAMENT AND OF THE COUNCIL

Hazardous to aquatic environment

Label elements	Acute	Chronic
Signal Word	Warning	Warning
Hazard Statement	H400: Very toxic to aquatic life	H410: Very toxic to aquatic life
Precautionary Statement Prevention	P 273 : Avoid release to the environment	P273: Avoid release to the environment
Precautionary Statement Response	P391: Collect spillage	P391: Collect spillage

Precautionary Statement Storage		
Precautionary Statement Disposal	P 501: Dispose of contents/container in accordance with local/regional/national/international regulation	P 501: Dispose of contents/container in accordance with local/regional/national/international regulation

Other regulatory information:

HMIS (Hazardous Materials Identification System) Classification
Health : 2
Flammability : 0
Physical Hazard : 0
Personal Protection : E

2= Moderate Hazard = Temporary or minor injury may occur
0= Minimal Hazard = Materials that will not burn
0= Minimal Hazard = Materials that are normally stable under fire conditions and will not react to water, polymerize, decompose, condense or self react.

NFPA (National Fire Protection Association) Ratings:
Health: **1** Flammability: **0** Reactivity: **0**

Section 16-Additional Information

Pantheon Fze provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, PANTHEON FZE WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

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