

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Description:	Zinc oxide sputtering target
Cat No. :	41124
Synonyms	Chinese white; Zinc white; C.I. Pigment White 4
CAS No	1314-13-2
Molecular Formula	O Zn

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use	Laboratory chemicals.
Uses advised against	No Information available

Details of the supplier of the safety data sheet

Importer	Supplier
Fisher Scientific Korea	Thermo Fisher Scientific Chemicals, Inc.
D5,D6, Incheon Airport Logistics Complex	30 Bond Street
150, Gonghangdong-Ro 296 Beon-Gil	Ward Hill, MA 01835-8099
Jung-Gu, Incheon	
Tel: +82-1661-9555	
Fax: +82-2-2023-0603	

E-mail address	Chem.KR@thermofisher.com
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Emergency Telephone Number

Emergency telephone: Medical: +(82) 070-7686-0086 or + 1-703-741-5970
 CHEMTREC: 080 822 1374 (Local), CHEMTREC: 1-800-424-9300 or + 1-703-527-3887
 Korea: 00-308-13-2549 (24 hours a day, 7 days a week)

SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture
Physical hazards

Based on available data, the classification criteria are not met

Health hazards

Based on available data, the classification criteria are not met

Environmental hazards

Acute aquatic toxicity	Category 1
Chronic aquatic toxicity	Category 1

Label Elements

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Signal Word

Danger

Hazard Statements

H400 - Very toxic to aquatic life

H410 - Very toxic to aquatic life with long lasting effects

Precautionary Statements

Prevention

P273 - Avoid release to the environment

Response

P391 - Collect spillage

Disposal

P501 - Dispose of contents/container to industrial incineration plant

Other Hazards

Toxic to terrestrial vertebrates

This product does not contain any known or suspected endocrine disruptors

NFPA

Health
1

Flammability
0

Instability
0

Physical hazards
N/A

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	Common Name	CAS No	Index No	Weight %
Zinc oxide	Chinese white; Zinc white; C.I. Pigment White 4	1314-13-2	KE-35565	99 - 100

SECTION 4: FIRST AID MEASURES

Description of first aid measures

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention if symptoms occur.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.

Ingestion

Do NOT induce vomiting. Get medical attention if symptoms occur.

Inhalation

Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention if symptoms occur.

Self-Protection of the First Aider

Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

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Most important symptoms and effects, both acute and delayed

No information available.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing media

Suitable Extinguishing Media

Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Extinguishing media which must not be used for safety reasons

No information available.

Special hazards arising from the substance or mixture

Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products

None under normal use conditions.

Advice for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes or clothing.

Environmental precautions

Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods and Material for Containment and Cleaning Up

Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

Reference to Other Sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Avoid dust formation.

Conditions for Safe Storage, Including any Incompatibilities

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Keep containers tightly closed in a dry, cool and well-ventilated place.

Specific End Uses

Use in laboratories.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Component	CAS No	Korea	ACGIH TLV	OSHA PEL
Zinc oxide	1314-13-2	STEL: 10 mg/m ³ TWA: 2 mg/m ³ TWA: 5 mg/m ³	TWA: 2 mg/m ³ STEL: 10 mg/m ³	(Vacated) TWA: 5 mg/m ³ (Vacated) TWA: 10 mg/m ³ (Vacated) STEL: 10 mg/m ³ TWA: 5 mg/m ³ TWA: 15 mg/m ³

Component	CAS No	European Union	The United Kingdom	Germany
Zinc oxide	1314-13-2	Not listed	Not listed	TWA: 0.1 mg/m ³ (8 Stunden). MAK TWA: 2 mg/m ³ (8 Stunden). MAK Höhepunkt: 0.4 mg/m ³ Höhepunkt: 4 mg/m ³

ACGIH - Biological Exposure Indices

Component	CAS No	ACGIH - Biological Exposure Indices
Zinc oxide	1314-13-2	Not listed

Exposure Controls

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection

Wear safety glasses with side shields (or goggles)

Hand Protection

Protective gloves

Skin and body protection

Long sleeved clothing

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Personal protective equipment

Respiratory Protection

Use only those certified by the Korea Occupational Safety and Health Administration.

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice

Environmental exposure controls

Prevent product from entering drains Do not allow material to contaminate ground water

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system Local authorities should be advised if significant spillages cannot be contained

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance (Physical State, Color, etc.) Off-white Powder Solid

Odor Odorless

Odor Threshold No data available

pH 7 50 g/l aq.sol.(susp)

Melting Point/Range 1975 °C / 3587 °F

Softening Point No data available

Boiling Point/Range No information available

Flash Point No information available Method - No information available

Evaporation Rate Not applicable Solid

Flammability (solid,gas) No information available

Explosion Limits No data available

Vapor Pressure No information available

Vapor Density Not applicable Solid

Specific Gravity / Density 5.600

Bulk Density No data available

Water Solubility 1.6 mg/L (29°C)

Solubility in other solvents No information available

Partition Coefficient (n-octanol/water)

Component	CAS No	log Pow
Zinc oxide	1314-13-2	No data available

Autoignition Temperature No data available

Decomposition Temperature No data available

Viscosity Not applicable Solid

Explosive Properties No information available

Oxidizing Properties No information available

Molecular Formula O Zn

Molecular Weight 81.38

SECTION 10: STABILITY AND REACTIVITY

Reactivity None known, based on information available

Chemical Stability Stable under normal conditions.

Possibility of Hazardous Reactions

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Hazardous Polymerization No information available.
Hazardous Reactions No information available.

Conditions to Avoid
Avoid dust formation. Incompatible products.

Incompatible Materials
Strong acids.

Hazardous Decomposition Products
None under normal use conditions.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

Information on expected route of exposure

Inhalation May cause irritation of respiratory tract. May be harmful if inhaled. Avoid breathing dust or spray mist.
Ingestion May be harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Eyes Avoid contact with eyes.
Skin May cause irritation. May be harmful in contact with skin. Avoid contact with skin.

Information on Health Hazards

(a) acute toxicity;

Oral Based on available data, the classification criteria are not met
Dermal No data available
Inhalation No data available

Component	CAS No	LD50 Oral	LD50 Dermal	LC50 Inhalation
Zinc oxide	1314-13-2	LD50 > 5000 mg/kg (Rat)	LD50 > 2000 mg/kg, 24h (Rat)	LC50 > 5.7 mg/L, 4h (Rat)

(b) skin corrosion/irritation; No data available
Test species rabbit
Observational endpoint No skin irritation

(c) serious eye damage/irritation; No data available
Test method Test method B.5
OECD 405
Test species rabbit
Observation end point No eye irritation

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

Component	CAS No	Test method	Test species	Study result
Zinc oxide	1314-13-2	in vivo OECD Test Guideline 406 Test method B.6	guinea pig	non-sensitising

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(e) germ cell mutagenicity; No data available

Component	CAS No	Test method	Test species	Study result
Zinc oxide	1314-13-2	in vitro OECD Test Guideline 471 Bacterial Reverse Mutation Test	in vitro: Bacteria	negative
		----- in vivo OECD Test Guideline 474 Mammalian	----- in vivo Mammalian	----- negative

Mutagenic effects have occurred in experimental animals

(f) carcinogenicity; No data available

Component	CAS No	Test method	Test species / Duration	Study result
Zinc oxide	1314-13-2	No data available	No data available	No data available

There are no known carcinogenic chemicals in this product

Component	CAS No	IARC	NTP	ACGIH	OSHA	UK
Zinc oxide	1314-13-2	Not listed	Not listed	Not listed	Not listed	Not listed

(g) reproductive toxicity; No data available

Component	CAS No	Test method	Test species / Duration	Study result
Zinc oxide	1314-13-2	No data available	No data available	No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; Not applicable
Solid

Other Adverse Effects
No information available.

Component	CAS No	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Zinc oxide	1314-13-2	Not applicable	Not applicable	Not applicable

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity effects Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	CAS No	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
Zinc oxide	1314-13-2	LC50: = 1.55 mg/L,	No data available	No data available	No data available

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		96h static (Danio rerio)			
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Persistence and degradability

Persistence

Soluble in water, Persistence is unlikely, based on information available.

Degradability

Not relevant for inorganic substances.

Degradation in sewage treatment plant

Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

Bioaccumulative potential

Bioaccumulation is unlikely

Mobility in soil

The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility. Highly mobile in soils.

Ozone Depletion Potential

Component	CAS No	Ozone Depletion Potential
Zinc oxide	1314-13-2	Not listed

Other adverse effects

No information available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from Residues/Unused Products

Waste is classified as hazardous. Dispose in accordance with the Wastes Control Act (폐기물관리법).

Contaminated Packaging

Dispose of this container to hazardous or special waste collection point.

Other Information

Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not let this chemical enter the environment.

SECTION 14: TRANSPORT INFORMATION

Road and Rail Transport

UN-No

UN3077

Proper Shipping Name

Environmentally hazardous substances, solid, n.o.s.

Technical Shipping Name

Zinc oxide

Hazard Class

9

Packing Group

III

IATA

UN-No

UN3077

Proper Shipping Name

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*

Technical Shipping Name

Zinc oxide

Hazard Class

9

Packing Group

III

IMDG/IMO

UN-No

UN3077

Proper Shipping Name

Environmentally hazardous substances, solid, n.o.s.

Technical Shipping Name

Zinc oxide

Hazard Class

9

Packing Group

III

Marine Pollutant

Dangerous for the environment

Product is a marine pollutant according to the criteria set by IMDG/IMO

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Special Precautions for User No special precautions required

SECTION 15: REGULATORY INFORMATION

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

Legend: X - Listed '-' - Not Listed

International Inventories

Component	CAS No	KECL	TSCA	EINECS	IECSC	DSL	NDSL	PICCS	ENCS	ISHL	AICS
Zinc oxide	1314-13-2	KE-35565	X	215-222-5	X	X	-	X	X	X	X

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Zinc oxide	1314-13-2	Not applicable	Not applicable	Not applicable	Annex I - Y23

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential
Zinc oxide	1314-13-2	Listed	Not applicable	Not applicable

Korean National Regulations

Component	CAS No	Act on Registration and Evaluation of Chemical Substances (K-REACH)	Authorised Chemicals	Existing Substances Subject to Registration
Zinc oxide	1314-13-2	Annex 1 - KE-35565	Not applicable	Listed

Component	CAS No	Chemical Control Act - Toxic Chemicals	Chemical Control Act - Prohibited Chemicals	Chemical Control Act - Use Restricted Chemicals
Zinc oxide	1314-13-2	2022-1-1099 (>25%)	Not applicable	Not applicable

Component	CAS No	Chemical Control Act - Accident Precaution Chemicals (% in mixtures)	Chemical Control Act - Accident Precaution Chemicals - Quantity limits Storage (% in mixtures)	Chemical Control Act - Accident Precaution Chemicals - Quantity limits Manufacture/Use (% in mixtures)
Zinc oxide	1314-13-2	Not applicable	Not applicable	Not applicable

Component	CAS No	Waste Control Law	Ministry of Environment - CMR risk	Ministry of Environment - Critically Controlled Substance
Zinc oxide	1314-13-2	> 25% (CCA)	Not applicable	Not applicable

Component	CAS No	ISHA - Harmful Agents Subject to Work Environment Monitoring	ISHA - Prohibited substances	ISHA - Substances requiring permission
Zinc oxide	1314-13-2	Listed	Not applicable	Not applicable

Component	CAS No	ISHA - Substances subject to control	ISHA - Harmful Agents Requiring Health Examination	ISHA - Permissible Exposure Limits
Zinc oxide	1314-13-2	Listed	Listed	Not applicable

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Component	CAS No	ISHA - Subject to Process Safety Reports (minimum quantity)	ISHA - Threshold Limit Values (TLVs) Chemicals	ISHA - Special management materials
Zinc oxide	1314-13-2	Not applicable	STEL: 10 mg/m ³ TWA: 2 mg/m ³ TWA: 5 mg/m ³	Not applicable

National Fire Association - Dangerous Substances Minimum quantity requiring a permit

Component	CAS No	Class 1 - Oxidising solids	Class 2 - Flammable solid	Class 3 - Spontaneously Combustible Substances and Dangerous Substances When Wet	Class 4 - Flammable liquids	Class 5 - Self-reactive substances	Class 6 - Oxidising liquids
Zinc oxide	1314-13-2	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

Control Parameters

Component	CAS No	Korea	ACGIH - Biological Exposure Indices
Zinc oxide	1314-13-2	STEL: 10 mg/m ³ TWA: 2 mg/m ³ TWA: 5 mg/m ³	Not listed

US Management Information

OSHA - Occupational Safety and Health Administration

Not applicable

Component	CAS No	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Zinc oxide	1314-13-2	Not applicable	Not applicable

CERCLA Not applicable

Component	CAS No	CERCLA Extremely Hazardous Substances RQs	Hazardous Substances RQs	SARA 313 - Threshold Values %
Zinc oxide	1314-13-2	Not applicable	Not applicable	1.0 %

GHS Classification - According to GB-CLP Regulations UK SI 2019/720 and UK SI 2020/1567

Warning.

H410 - Very toxic to aquatic life with long lasting effects.

SECTION 16: OTHER INFORMATION

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

IECSC - Chinese Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

ENCS - Japanese Existing and New Chemical Substances

AICS - Australian Inventory of Chemical Substances

NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit

ACGIH - American Conference of Governmental Industrial Hygienists

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

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RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
POW - Partition coefficient Octanol:Water

LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC - (Volatile Organic Compound)

Key literature references and sources for data

<https://echa.europa.eu/information-on-chemicals>
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice

Chemical incident response training.

Prepared By	Health, Safety and Environmental Department
Creation Date	19-Jan-2010
Revision Date	09-Jun-2024
Revision Number	6
Revision Summary	New emergency telephone response service provider.

MOEL's Public Notice No. 2023-9 (Standards for Classification and Labeling of Chemical Substances and Safety Data Sheets)

Disclaimer

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End of Safety Data Sheet