Material Safety Data Sheet
(GHS-MSDS)

HANIL CHEMICAL IND. CO., LTD.

Material Safety Data Sheet

Name of Material	ACTIVE ZINC OXIDE

CAS NO	KE NO	UN NO	EC NO
1314-13-2	KE-35565	3077	215-222-5

1. Information related to chemical products and company

A. Product name : Active Zinc Oxide (AZO-50)

B. Recommended use of product and restrictions on use

○ Recommended use : Acceleration adjuvant for vulcanization of rubber, basic raw materials for electronic materials, cosmetics, antibacterial agents, paint pigments, electrolysis, electroplating, batteries, and alloy pigments

○ Restrictions on use : No data

C. Manufacturer/Supplier/Distributor Information

○ Name of supply company : Hanil Chemical Ind. Co., Ltd.

○ Address : 37, Gongdan 1-daero, Jeongwang-dong, Siheung-si, Gyeonggi-do (Sihwa Industry Complex 1-na 803)

○ Information provision service or emergency contact telephone number : 031-499-8201-4 (FAX 031-499-8207)

○ Corresponding department : Quality assurance department

2. Hazard risk

A. Classification of hazard risks Acute aquatic environment toxicity : Classification 1
Chronic aquatic environment toxicity : Classification 1

B. Warning label items including precautionary statements

○ Pictorial symbol

○ Signal word : Warning

○ Hazard risk statements

H400	Very toxic to aquatic organisms
H410	Very toxic to aquatic organisms due to long-term effects

○ Precautionary statements

- Prevention	P273	Do not release to the environment.
- Response	P391	Collect spillage.
- Storage	No data	
- Disposal	P501	(According to the content described in the relevant legislations) Discard the content container.

C. Other hazards and risks not included in classification standards for hazards and risks (NFPA)

- Sanitation 0
- Fire No data
- Reactivity No data

3. Name and content of constituents

A. Chemical name : Active Zinc Oxide (AZO-50)
B. Synonym (common name) : Zinc white, Active zinc oxide
C. Chemical formula : ZnO
D. Molecular weight : 81.38
E. Content (%) : 90.0%
F. CAS NO : 1314-13-2

4. Emergency measures

A. Contact in eye : Receive emergency medical treatment
When contact with materials, immediately wash skin and eye for more than 20 minutes with running water

B. Contact with skin : Receive emergency medical treatment
When in contact with materials, immediately wash skin and eye for more than 20 minutes with running water
Remove contaminated clothing and shoes and isolate contaminated area

C. When inhaled : Receive emergency medical treatment
Move to a place with fresh air.
Supply oxygen if breathing is difficult.
Perform artificial respiration in the case of not breathing

D. When ingested : Receive emergency medical treatment

E. Other precautions by medical doctors : Healthcare works should be aware of the substance and take protective measures

5. Measures in case of explosion and fire

A. Appropriate (inappropriate) extinguishing agent : Use alcohol foams, carbon dioxide or water sprays upon extinguishment related to this substance.
Use dry sand or dirt upon extinguishment by smothering

B. Specific hazards occurring from chemical substances :
When heating, the container may explode
Inhalation of the substance may be harmful
Inhalation of asbestos may damage the lungs

Vapor that may cause dizziness and suffocation may be generated in some liquids
Upon fire, irritating, corrosive, or toxic gas may be generated
Parts may burn but do not easily ignite
In case of contact, skin and eye may be damaged by burning

C. Protective equipment and precautions for fire fighting :

For disposal of fire water, isolate by digging a ditch and do not disperse the material
If not dangerous, remove the container from the fire area
Be careful because parts may be transported at high temperature
Escape from the area, maintain a safe distance, and extinguish
In case of tank fire, even after extinguishment is completed, cool the container with a large amount of water
In case of tank fire, when there is a high-pitched sound in the pressure relief device or the tank becomes discolored, immediately move away
In case of tank fire, move away from the tank which is inflamed

6. Measures for leakage accidents

A. Measures and protective equipment necessary for protection of body :

Do not touch exposure water or walk on the water.
Prevent the formation of dust
Immediately wipe spilled items, and follow preventive measures in the section for protective equipment
Stop leakage if not dangerous
Be careful of substances and conditions to avoid.

B. Measures necessary for protecting the environment :

Exposure water may cause contamination

Prevent inflows into waterway, sewer, basement, and sealed space
Do not release into the environment.

C. Purification or removal method :

Collect spillage
In the case of leakage of a large amount, make a ditch far away from liquid leakage
In the case of powder leakage, cover with a plastic sheet to prevent spreading and maintain in a dry condition.
In the case of leaking a small amount, absorb with inflammable substances and place in a container
Absorb the liquid and wash the contaminated area with a detergent and water
Place the spillage in a clean and dry container with a clean shovel, and after loosely closing the container, move the container out of the area of leakage

7. Handling and storage methods

A. Safety handling : Be careful of high temperature
Perform operation by referencing the engineering control personal protective equipment
Follow all GHS-MSDS/Label preventive measures because the product residue may remain even after the container is empty
Be careful of substances and conditions to avoid.

B. Safe storage method : Be careful of substances and conditions to avoid

8. Exposure prevention and personal protective equipment

A. Exposure standards of chemical compounds, biological exposure standards, etc.

○ Domestic standards : TWA 2 ㎎/㎥ zinc oxide dust
TWA - 5 ㎎/㎥ STEL - 10 ㎎/㎥ zinc oxide

○ ACGIH standards : TWA - 2 ㎎/㎥
STEL - 10 ㎎/㎥

○ Biological exposure standards : No data

B. Appropriate engineering controls No data

C. Personal protective equipment

○ Respiratory protection : Zinc oxide

Wear respiratory protective equipment for physical and chemical properties of the exposed particulate matter, which has been certified by Korea Occupational Safety and Health Agency

When the exposure concentration is below 50 mg/m3, wear half-face respiratory protective equipment mounted with an appropriate filter

When the exposure concentration is below 125mg/m3, wear loose-fitting hood/helmet-type electric respiratory protective equipment mounted with an appropriate filter or a continuous flow dust mask

When the exposure concentration is below 250mg/m3, wear full-face or electric half-face or air-supplied continuous flow/pressure-demanding half-face respiratory protective equipment mounted with an appropriate filter

When the exposure concentration is below 5,000mg/m3, wear full-face or helmet/hood-type, pressure-demanding respirator mounted with an appropriate filter

When the exposure concentration is below 50,000mg/m3, wear a self-contained breathing apparatus (SCBA) or pressure-demanding self-contained breathing respiratory protective equipment mounted with an appropriate filter

Zinc oxide dust

Wear protective equipment for respiration for physical and chemical properties of the exposed particulate matter, which has been certified by Korea Occupational Safety and Health Agency

When the exposure concentration is below 20 mg/m3,

wear half-face respiratory protective equipment mounted with an appropriate filter
When the exposure concentration is below 50mg/m3, wear loose-fitting hood/helmet-type electric respiratory protective equipment mounted with an appropriate filter or a continuous flow dust mask
When the exposure concentration is below 250mg/m3, wear full-face or electric half-face or air-supplied continuous flow/pressure-demanding half-face respiratory protective equipment mounted with an appropriate filter
When the exposure concentration is below 100mg/m3, wear full-face or electric half-face or air-supplied continuous flow/pressure-demanding half-face respiratory protective equipment mounted with an appropriate filter
When the exposure concentration is below 2,000mg/m3, wear full-face or helmet/hood-type, pressure-demanding respirator mounted with an appropriate filter
When the exposure concentration is below 20,000mg/m3, wear a self-contained breathing apparatus (SCBA) or pressure-demanding self-contained breathing respiratory protective equipment mounted with an appropriate filter

○ Eye protection : No data

○ Hand protection : No data

○ Body protection : No data

9. Physical and chemical property

A. Appearance	State : solid (powder)
	Color : white and white yellow
B. Scent	Scentless
C. Scent threshold	None
D. pH	7.50-10.00
E. Melting point/freezing point	1,000 ℃ (at 1 atm)
F. Initial boiling point and range of boiling points	No data
G. Flash point	No data
H. Evaporation rate	No data
I. Flammability (solid, gas)	No data
J. Upper/lower limit of ignition or explosion range	No data
K. Vapor pressure	mmHg(21℃)
L. Solubility	2.9 ㎎/L(20℃, pH =6.07-6.55)
M. Vapor density	(> 1)
N. Specific gravity	5.68 (22℃)
O. n-Octanol/water distribution coefficient	No data
P. Spontaneous combustion temperature	No data
Q. Decomposition temperature	No data
R. Viscosity	No data
S. Molecular weight	81.38

10. Stability and reactivity

A. Chemical stability and possibility of hazardous reaction :

The container may explode upon heating.
Parts may burn but do not easily ignite
In case of contact, skin and eye may be damaged by burning
Upon fire, irritating or toxic gas may be generated
Inhalation of the substance may be harmful
Vapor that may cause dizziness and suffocation may be generated in some liquids
Inhalation of asbestos may damage the lungs

B. Conditions to avoid : Heat

C. Substances to avoid : No data

D. Hazardous substance generated during decomposition : Irritating and toxic gas

11. Information related to toxicity

A. Information related to exposure path with high possibility : No data

B. Health hazard information

Acute toxicity

Oral	LD50 > 5,000 mg/kg Rat
Percutaneous	No data
Inhalation	Dust LC50 7.8 mg/m3 3hr Guinea pig

○ Skin corrosiveness or irritation : Irritation was not observed as a result of skin corrosiveness/irritation tests using mice

○ Severe eye damage or irritation : Irritation was not observed as a result of severe skin damage/irritation tests using artificial cornea

○ Respiratory hypersensitiveness : No data

○ Skin hypersensitiveness : Not a skin hypersensitive material

○ Carcinogenicity :

Occupational Safety and Health Act	No data
Notice of Ministry of Employment and Labor	No data

IARC	No data
OSHA	No data
ACGIH	No data
NTP	No data
EU CLP	No data

○ Reproductive cell mutagenicity : As a result of in vitro DNA damage and recovery test, ambiguous results, and as a result of in vivo micronucleus tests using mammalian erythrocytes, negative OECD Guideline 474, GLP

○ Reproductive toxicity : Reproductive toxicity was observed at a higher concentration than the concentration where other effects are already present, and it is considered that the human

reproductive effects will not be exhibited at exposure concentrations where clinical symptoms are not clear.

○ Specific target organ toxicity (single exposure) :

As a result of inhalation toxicity tests using rats, no particular effects were observed other than merely not shiny hairs OECD TG 403

○ Specific target organ toxicity (repeated exposure) :

As a result of repeated inhalation toxicity tests using rats, the iron content increased in the lung after 3 months. Oxygen species activated by macrophages in the lung showed the maximum activity value in the macrophage culture tube in the lung. Significantly reduced active oxygen secretion was observed 1.5mg, 4.5mg/m3 NOAEL = 1.5mg/m3 airOECD 413, GLP

○ Absorption hazards : No data

○ Other hazardous effects No data

12. Impact on the environment

A. Ecotoxicity

○ Fish : LC50 3.31 ㎎/L 96 hr other() ()※Source : ECHA

○ Crustacean : LC50 0.5 ㎎/L 48 hr Ceriodaphnia dubia(Similar material: 7440-66-6, GLP) ()※Source : ECHA

○ Bird : No data

B. Persistence and degradability

○ Persistence : No data

○ Degradability : No data

C. Bioaccumulation

○ Accumulation : 1050 ()※Source : ECHA

○ Biodegradability : No data

D. Soil mobility : No data

E. Other hazardous effects : No data

13. Precautions for disposal

A. Disposal method : No data

B. Precautions for disposal : (According to the content specified in the relevant legislations) Dispose of the content container

14. Information necessary for transport

A. UN No. : 3077

B. Proper shipment name : Environmentally hazardous material (solid)(Not specified in Attached Table 1 and including those specified in "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal")(ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N. O. S.)

C. Hazard class for transport : 9

D. Container grade : Ⅲ

E. Marine pollutants: Applicable (MP)

F. Special safety measures that users need to know regarding transport or transportation means or are necessary

○ Emergency measures at the time of fire: F-A

○ Emergency measures at the time of leakage: S-F

15. Information of applicable regulations

A. Regulations by the Occupational Safety and Health Act :

Work environment measurement material (measurement cycle : 6 months)
Special health diagnosis material (diagnosis cycle : 12 months)
Hazardous material to be controlled
Exposure standard setting material

B. Regulations by the Toxic Chemicals Control Act : Not applicable

C. Regulations by the Safety Control of Dangerous Substances Act : Not applicable

D. Regulations by the Wastes Control Act : Not applicable

E. Other regulations by domestic or overseas legislations

Domestic regulations

Act on Control of Persistent Organic Pollutants : Not applicable

Overseas regulations

US control information (OSHA standards):	Not applicable
US control information (CERCLA standards):	Not applicable
US control information (EPVRA 302 standards)	Not applicable
US control information (EPCRA 304 standards)	Not applicable
US control information (EPCRA 313 standards)	Not applicable
US control information (Rotterdam Convention material)	Not applicable
US control information (Stockholm Convention material)	Not applicable
US control information (Montreal Protocol material)	Not applicable
EU classification information (confirmed classification result)	Aquatic acute 1
	Aquatic chronic 1
EU classification information (hazardous phrases)	H400
	H410
EU classification information (hazardous phrases)	Not applicable

16. Other references

A. Source of data

ECHA (phase)

ECHA (color)

ECHA (B scent)

ECHA (E melting point/freezing point)

ECHA (L solubility)

ECHA (N specific gravity)

HSCB (Oral)

ECHA (Inhalation)

ECHA (Skin corrosiveness or irritation)

ECHA (Severe eye damage or irritation)

ECHA (Skin hypersensitiveness)

ECHA (Reproductive cell mutagenicity)

OECD SIDS (Reproductive toxicity)

ECHA (Specific target organ toxicity (single exposure))

ECHA (Specific target organ toxicity (repeated exposure))

ECHA (Fish)

ECHA (Crustacean)

ECHA (Condensability)

ECHA (E other hazardous effect)

Korea Occupational Safety and Health Agency

KOSHANET (Safety Health Information Service)

B. ○ This material safety data sheet (MSDS) is prepared by reconstructing materials provided by Korea Occupational Safety and Health Agency in accordance with "preparation and posting of MSDS by business owner" of Article 41 of the Occupational Safety and Health Act for the protection of the health of workers in the GHS-MSDS form according to the situation of Hanil Chemical Ind. Co., Ltd.

○ This MSDS is used as educational material on the safety and healthy of workers in the corresponding work place in accordance with Article 41 of the Occupational Safety and Healthy Act and is prohibited for commercial use.

○ Using this MSDS for external purposes can be punished according to related legislations such as the Copyright Act, etc.

C. Revision history

- Originally created : 1992
- Number of revisions : 18
- Last revision date : 2017. 10. 23

- End -