Date of issue: Aug 13, 2024.
Date of revision: Aug 29, 2024.
Version: 1

LIPMEN COMPANY LTD.
(주) 립 멘

SAFETY DATA SHEET

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

A. Product Name Oxygen Absorber (HLS, HS-Type)

B. Recommended Use and Use Restrictions for Products

a. Recommended Use: Absorber
b. Restrictions on Use: Please do not use it for any purpose other than the recommended purpose.

C. Supplier Information

a. Company Name: LIPMEN CO., LTD,
b. Address: Lipmen Co., Ltd. 10 Gilpa-ro 41beon-gil, Michuhol-gu, Incheon, Republic of Korea
c. Telephone: +82-32-865-8166 ~ 70

D. Manufacturer/Supplier Additional Information

N/A

SECTION 2. HAZARDS IDENTIFICATION

A. GHS Classification

a. Physical Hazards: N/A
b. Health Hazards: N/A
c. Environmental Hazards: N/A

B. Label Elements

a. Symbols: N/A
b. Signal Word: N/A
c. Hazard Statement: N/A
d. Precautionary Statement
- Disposal: N/A
- Prevention: N/A
- Response: N/A
- Storage: N/A

C. Other Hazards and Risks Not Included in the Criteria for GHS Classification

No Data Available

SECTION 3. COMPOSOTION/INFORMATION ON INGREDIENTS

Chemical Components	CAS No.	EC No.	% by Wgt
Iron	7439-89-6	640-395-2	60-70
Silica	112926-00-8	601-214-2	10-20
Water	7732-18-5	231-791-2	15-20
Salt	-	-	0-5

SECTION 4. FIRST-AID MEASURES

A. Eye contact

Wash your eyes and under the eyes thoroughly with water.

If the eye irritation persists, see a doctor.
Key symptoms: May cause mechanical irritation.

B. Skin contact

Take off your contaminated clothes. Wash your skin with soapy water.
If the skin irritation persists, see a doctor.
Key symptoms: Prolonged contact can cause irritation.

C. Inhalation

Move to a place with fresh air.
If the symptoms persist, see a doctor.
Major symptoms: Cough or shortness of breath, and can also irritate the respiratory tract.

D. Ingestion

Wash your mouth.
If you swallow and feel uncomfortable, see a doctor.
Key symptoms: Ingestion can cause gastrointestinal irritation, nausea, vomiting and diarrhea.

E. Other doctor's precautions.

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

SECTION 5. FIRE-FIGHTING MEASURES

A. Appropriate (and inappropriate) extinguishing agent

Large fire: water spray/fog, regular foam (appropriate fire extinguishing agent)
High Pressure Water (Inappropriate fire extinguishing agent)
Small fire: dry sand, dry chemical, alcohol-resistant foam, water spray, general foam, CO_2 (appropriate fire extinguishing agent)

B. Special hazards arising from the substance or mixture

Inhalation of substances can be harmful.
Can be ignited by heat, spark, and flame.
In case of fire, irritable and toxic gases may be generated.
Some may burn, but do not ignite easily.

C. Protective equipment and precautions for firefighters.

In the event of a fire, wear all self-breathing and protective equipment.
Digest away from the area and maintain a safe distance.
Leaks may cause contamination.

SECTION 6. ACCIDENTAL RELEASE MEASURES

A. Measures and protections necessary to protect the human body

Don't let the dust form.
Remove all ignition sources.
See paragraph 8 for personal protective equipment.

B. Measures necessary to protect the environment

Prevent inflows into waterways, sewers, basement and enclosed spaces.

C. The methods of purification and removal

If any material has leaked, sweep it with an electrically protected vacuum or wet broom and place it in a disposal container.

SECTION 7. HANDLING AND STORAGE

A. Safety handling tips

Avoid inhalation, ingestion, skin and eye contact.
Generally, handle materials safely when used.
Pay attention to substances and conditions that should be avoided.
Do not apply pressure or shock.
Do not expose to heat, sparks, flames, or other sources of ignition.
Wash thoroughly after handling

B. Secure storage methods (Includes conditions to avoid)

Keep it airtight.
Stay away from direct sunlight and away from heat, sparks and flames.
Store in a cool, dry place.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

A. Control parameters

Domestic Regulations	Iron	TWA :	No Data Available	STEL :	No Data Available
	Silica	TWA :	10 mg/m^3	STEL :	-
	Water	TWA :	No Data Available	STEL :	No Data Available
	Salt	TWA :	No Data Available	STEL :	No Data Available
ACGIH Regulations	Iron	TWA :	1 mg/m^3	STEL :	No Data Available
	Silica	TWA :	No Data Available	STEL :	No Data Available
	Water	TWA :	No Data Available	STEL :	No Data Available
	Salt	TWA :	No Data Available	STEL :	No Data Available
Biological exposure limits	Iron	TWA :	No Data Available	STEL :	No Data Available
	Silica	TWA :	No Data Available	STEL :	No Data Available
	Water	TWA :	No Data Available	STEL :	No Data Available
	Salt	TWA :	No Data Available	STEL :	No Data Available
Other exposure limits	Iron	TWA :	No Data Available	STEL :	No Data Available
	Silica	TWA :	No Data Available	STEL :	No Data Available
	Water	TWA :	No Data Available	STEL :	No Data Available
	Salt	TWA :	No Data Available	STEL :	No Data Available

B. Appropriate engineering controls

Use process enclosures, local exhaust ventilation, or keep airborne levels below recommended exposure limits.

C. Personal protective equipment

Respiratory protection	Wear respirator certified by the KOSHA, which conforms to the physical and chemical properties of the exposed material.
Eye protection	Install facilities and emergency shower facilities near the workplace. The use of safety goggles (full-face shield) is recommended.
Hand protection	Wear appropriate chemical resistant protective gloves
Skin and body protection	Wear appropriate protective clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

A. Characteristics by Components

Components	Categories		Contents
Iron	A. Physical state	Appearance	Solid (Powder)
		Color	Grayish-black
	B. Odor		Odorless
	C. Odor threshold		No Data Available
	D. pH		No Data Available
	E. Melting point/Freezing point		1538 ℃ (101 hPa)
	F. Boiling point		2861 ℃ (1013 hPa)
	G. Flash point		No Data Available

	H. Evaporation rate		No Data Available
	I. Flammability (Solid, Gas)		Non-flammable
	J. Upper/lower flammability or explosive limits		No Data Available
	K. Vapor presure		1 Pa (1455℃)
Iron	L. Solubility(ies)		(insoluble in water, alkali, alcohol, ether; soluble in acid)
	M. Vapor density		7.87 g/㎤ (20℃, Density)
	N. Density		7.86 ((Water=1))
	O. Partition coefficient (n-Octanol/water)		No Data Available
	P. Auto-ignition temperature		No Data Available
	Q. Decomposition temperature		No Data Available
	R. Viscosity		No Data Available
	S. Molecular weight		55.845
Silica	A. Physical state	Appearance	Solid(Powder)
		Color	White
	B. Odor		Odorless
	C. Odor threshold		No Data Available
	D. pH		Approximately 7 (100 g/L, 20℃, slurry)
	E. Melting point/Freezing point		1710℃
	F. Boiling point		2230℃
	G. Flash point		Nonflammable
	H. Evaporation rate		No Data Available
	I. Flammability (Solid, Gas)		No Data Available
	J. Upper/lower flammability or explosive limits		No Data Available
	K. Vapor presure		No Data Available
	L. Solubility(ies)		(Partially insoluble in water)
	M. Vapor density		2.2 g/cm^3 (25℃)
	N. Density		2.6 ((Water=1))
	O. Partition coefficient (n-Octanol/water)		No Data Available
	P. Auto-ignition temperature		No Data Available
	Q. Decomposition temperature		No Data Available
	R. Viscosity		No Data Available
	S. Molecular weight		60.0800018310547
Water	A. Physical state	Appearance	Liquid
		Color	Colorless
	B. Odor		Odorless
	C. Odor threshold		No Data Available
	D. pH		7
	E. Melting point/Freezing point		0℃
	F. Boiling point		100℃
	G. Flash point		No Data Available
	H. Evaporation rate		No Data Available
	I. Flammability (Solid, Gas)		N/A
	J. Upper/lower flammability or explosive limits		No Data Available
	K. Vapor presure		23.8 mmHg (25℃)
	L. Solubility(ies)		100 g/100mL
	M. Vapor density		No Data Available
	N. Density		1
	O. Partition coefficient (n-Octanol/water)		-1.38
	P. Auto-ignition temperature		No Data Available

	Q. Decomposition temperature		No Data Available
	R. Viscosity		No Data Available
	S. Molecular weight		18.02
Salt	A. Physical state	Appearance	Solid(Powder)
		Color	White
	B. Odor		Odorless
	C. Odor threshold		No Data Available
	D. pH		6.7 (6.7-7.3)
	E. Melting point/Freezing point		801℃
	F. Boiling point		1413℃
	G. Flash point		No Data Available
	H. Evaporation rate		No Data Available
	I. Flammability (Solid, Gas)		No Data Available
	J. Upper/lower flammability or explosive limits		No Data Available
	K. Vapor presure		9.01575 mmHg (at 1026.85℃)
	L. Solubility(ies)		360000 mg/L
	M. Vapor density		No Data Available
	N. Density		2.16
	O. Partition coefficient (n-Octanol/water)		-0.46
	P. Auto-ignition temperature		No Data Available
	Q. Decomposition temperature		No Data Available
	R. Viscosity		No Data Available
	S. Molecular weight		58.44

SECTION 10. STABILITY AND REACTIVITY

A. Chemical stability and possibility of hazardous reactions

Stable under normal conditions.
In case of fire, irritable and toxic gases may be generated.

B. Conditions to avoid(e.g., static discharge, shock, or vibration etc)

Heat, Flames, and Sparks

C. Substances to avoid

Strong oxidizing agents and strong acids

D. Hazardous decomposition products

No Data Available

SECTION 11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

Iron	No Data Available
Silica	No Data Available
Water	No Data Available
Salt	No Data Available

B. Health hazard information

Acute Toxicity	Oral	Iron	LD50 98.6 g/kg Rat
		Silica	LD50 > 5,000 mg/kg bwRat (OECD TG 401, GLP)
		Water	LD50 90000 mg/kg Rat (LD50 > 90 mL/kg (Rat))
		Salt	LD50 3000 mg/kg Rat
	Dermal	Iron	LD50 20000 mg/kg Guinea pig

		Silica	LD50 > 2000 mg/kg Rabbit, No death
		Water	No Data Available
		Salt	LD50 > 10000 mg/kg Rabbit
	Inhalation	Iron	Dust, LC50> 250 mg/m^3 6 hr Rat
		Silica	No Data Available
		Water	No Data Available
		Salt	Dust, LC50 > 10.5 mg/L 4 hr Rat
Skin irritation/corrosion		Iron	Edema score: 0/0, not irritating, Rabbit, OECD TG 404
		Silica	Not irritating, Rabbit (OECD TG 404)
		Water	No Data Available
		Salt	Rabbit: weak irritation
Serious eye damage/ eye irritation		Iron	Not irritating, Rabbit, cornea opacity score(0), iris score(0), conjunctivae score(0), OECD TG 405
		Silica	Not irritating, Rabbit (OECD TG 405)
		Water	No Data Available
		Salt	Rabbit: weak irritation
Respiratory sensitisation		Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
Skin sensitisation		Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
Carcinogenicity	IARC	Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
	NTP	Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
	OSHA	Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
	ACGIH	Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
	Occupational safety and health act	Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
	Ministry of employment and labor notice	Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
	EU CLP	Iron	No Data Available
		Silica	No Data Available
		Water	No Data Available
		Salt	No Data Available
Germ cell mutagenicity		Iron	In vitro - bacterial reverse mutation assay: negative(S. typhimurium TA97a, TA98, TA100,

		TA102, TA1535, TA1537 & TA1538, with and without metabolic activation system), OECD TG 471
	Silica	The results of the bacterial reverse mutation assay conducted using microbial strains within test tubes showed negative outcomes regardless of metabolic activity (OECD Guideline 471, GLP). Similarly, the mammalian gene mutation test within test tubes also yielded negative results irrespective of metabolic activity (OECD Guideline 476, GLP). Additionally, the mammalian chromosomal aberration test conducted within test tubes showed negative results regardless of metabolic activity (OECD Guideline 473, GLP). Furthermore, the chromosomal aberration test using mammalian bone marrow cells and the dominant lethal test using mammals both yielded negative results (OECD Guideline 475 and 478, respectively).
	Water	No Data Available
	Salt	In vitro - Mammalian Gene Mutation Test: Positive (Mouse lymphoma L5178Y cells; absence of metabolic activation) In vivo - Chromosomal Aberration Test: Positive (Rat, Bone Marrow Cell) - OECD Guideline 475 In vitro - Bacterial Reverse Mutation Test: Negative (Salmonella typhimurium strains TA97, TA98, TA100, TA1535, TA 1537, TA1538; regardless of metabolic activation) - OECD Guideline 471
Reprotoxic	Iron	No Data Available
	Silica	Developmental toxicity/teratogenicity Test Results Not Effective. NOAEL=1350mg/kg bw/day (OECD Guideline 414)
	Water	No Data Available
	Salt	As a result of the developmental toxicity test using rats, blood pressure increased in the parent generation and cardiac hypertrophy was observed as a result of the test at a concentration of 1-2% through oral.
Repeated dose toxicity (1 exposure)	Iron	No Data Available
	Silica	Inhalation toxicity test results show slight anxiety and eye obstruction (OECD TG 403, GLP) Percutaneous toxicity test results show slight erythema
	Water	No Data Available
	Salt	Rat/oral (1 mg/kg/24hr) : Sodium-Potassium emission impact
Repeated dose toxicity (Repeated exposure)	Iron	No Data Available
	Silica	No Data Available
	Water	No Data Available

	Salt	As a test method for OECD TG 453, gastritis and gastric ulcer were observed at a concentration of 0.25% (KCl), 1% (KCl), 4% (KCl), 4% (NaCl), 2% (KCl) + 2% (NaCl) for 2 years through oral exposure of rats (male)
Aspiration hazards	Iron	No Data Available
	Silica	No Data Available
	Water	No Data Available
	Salt	No Data Available

SECTION 12. ECOLOGICAL INFORMATION

A. Toxicity

Fish	Iron	LC50 8.65 mg/L 96 hr Oncorhynchus mykiss
	Silica	LC50 10000 mg/L 96 hr Lepomis cyanellus
	Water	No Data Available
	Salt	LC50 5840 mg/L 96 hr Lepomis macrochirus (Reliability 1, ASTM E729)
Crustaceans	Iron	LC50 106.3 mg/L 96 hr Leptophlebia marginata L.
	Silica	EC50 > 1000 mg/L 24 hr Daphnia magna
	Water	No Data Available
	Salt	LC50 874 mg/L 48 hr Daphnia magna (Reliability 2, Standard methoods for the Examination of Water and Waste Water)
Algae	Iron	EC50 18 mg/L 72 hr Pseudokirchneriella subcapitata
	Silica	EL50 > 10000 mg/L 72 hr Isochrysis Galbana
	Water	No Data Available
	Salt	EC50 6870 mg/L 96 hr ((Lemna minor, Growth Rate)_Reliability 1, OECD TG 221, GLP)

B. Persistence and degradability

Persistence	Iron	No Data Available
	Silica	No Data Available
	Water	log Kow -1.38
	Salt	log Kow -0.46
Degradability	Iron	No Data Available
	Silica	No Data Available
	Water	No Data Available
	Salt	No Data Available

C. Bioaccumulative potential

Bioaccumulative	Product	No Data Available
	Iron	No Data Available
	Calcium hydroxide	No Data Available
	Silicon dioxide	BCF 3.162
Biodegradative	Product	No Data Available
	Iron	No Data Available
	Calcium hydroxide	No Data Available
	Silicon dioxide	No Data Available

D. Mobility in soil

Iron	No Data Available
Silica	No Data Available
Water	No Data Available

Salt	No Data Available

E. Other adverse effects

Iron	No Data Available
Silica	No Data Available
Water	No Data Available
Salt	No Data Available

SECTION 13. DISPOSAL CONSIDERATIONS

A. Disposal method

No Data Available

B. Precautions for diposal (including disposal methods of contaminated containersand packaging)

No Data Available

SECTION 14. TRANSPORT INFORMATION

A. UN No.

N/A

B. UN Proper shipping name

N/A

C. Transportation category risks

N/A

D. Marine pollutants (Applicable or Not-applicable)

N/A

E. Special safety measures that users need to know or need to know about transportation or means of transportation

Emergency measures in case of fire

N/A

Emergency measures in case of spillage

N/A

SECTION 15. REGULATORY INFORMATION

A. Regulations under the Occupational Safety and Health Act

Iron	Hazardous substances subject to control, Substances of exposure criteria setting
Silica	Substances of exposure criteria setting

B. Regulations under the Chemical Substances Control Act

N/A

C. Regulations under the Dangerous Goods Safety Management Act

Iron	Class 2 : Iron Powder(500kg)

D. Regulations under the Waste Management Act

Iron	Designated waste
Silica	Designated waste

E. Other domestic and overseas regulations

Domestic reculations	N/A
Overseas reculations	N/A

SECTION 16. OTHER INFORMATION

A. The source of the data

- Exposure criteria for chemicals and physical factors
- Enforcement Rules of the Occupational Safety and Health Act [Attachment 19]
- Enforcement Decree of the Occupational Safety and Health Act [Attachment 13]
- Designation of Restricted Substances and Prohibited Substances [Asterisk 2]
- Designation of Restricted Substances and Prohibited Substances [Asterisk 4]
- Notification of Designation of Toxic Substances [Asterisk] (Toxic Substances that meet the designated standards under Article 3 of the Enforcement Decree of the Act on the Registration and Evaluation of Chemical Substances and Article 2 of the Enforcement Decree of the Act on the Registration and Evaluation
- Enforcement Rules of the Chemical Substances Control Act [Attachment 10]

B. Issued Date

Aug 13, 2024.

C. Number of revisions and last revision date.

Number of revisions : 1 Last revision date : Aug 29, 2024.

D. Others

- This MSDS was prepared based on Article 110 of the Occupational Safety and Health Act, notification No. 2023-9, on the classification of chemicals and the preparation of material safety and health data.
- Please note that this MSDS is designed to assist buyers, handlers, or third parties in the handling of material safety and therefore cannot be guaranteed for special purposes or commercial applications or expressions used in combination with other substances, nor is it subject to any technical or legal responsibility.
- Buyers and handlers are responsible for verifying and complying with government and local regulations, as the content of this MSDS may vary by country and region and may not be consistent with the actual relevant regulations.
- This MSDS is specific to a specific product and may not apply to other materials and other manufacturing processes that are not otherwise specified, so it does not guarantee that you comply with all regulations related to your direct activities.

○ The prepared Material Safety Data (MSDS) was edited and partially modified by referring to the MSDS provided by the Korea Occupational Safety and Health Agency.