

Safety Data Sheet (SDS)

1. Product and company identification

A. Product Identifier

- Product Name: LIQUID MINERAL FERTILIZER

B. Recommended use of the chemical and restrictions on use

- Use category: 1. Feed materials, Intermediates, 11.1 Fertilizers, 48. Others
- Against use: Do not use other than recommended use.

C. Manufacturer/Supplier/Distributor Information

- Supplier's details:
 - Name: Korea Germanium Farms CO.,LTD
 - Address: 102, Seonbi-ro 265, Yeongju-si, Gyeongsangbuk-do (Seongdong Shopping Center), Republic of Korea
 - Emergency Phone number: Tel) +82-(0)54-436-4001, 010-3355-3343

2. Hazards identification

A. Hazard. Risk Classification

- criteria not met

B. Label elements including precautionary statements

- Symbol: Not Applicable
- Signal Word: Not Applicable
- Hazard-Risk Statement: Not Applicable
- Precautionary Statement:
 - 1) Prevention: Not Applicable
 - 2) Response: Not Applicable
 - 3) Storage: Not Applicable
 - 4) Disposal: Not Applicable

C. Other Hazard. Risk which are not included in the classification criteria (e.g. dust explosion hazard)

- No data

3. Composition/Information on ingredients

Chemical Name	Other name	CAS No.	Content(%)
Calcium oxide	-	1305-78-8	0.118
Aluminium oxide	Alumina	1344-28-1	1.46

Titanium dioxide :	Titania; Titanic acid anhydride	13463-67-7	0.03
Diiron trioxide	-	1309-37-1	0.308
Dipotassium oxide	Dipotassium monoxide; Potassium monoxide; Potassium oxide; Potassium oxide (K ₂ O)	12136-45-7	0.445
Magnesium oxide	Magnesia; Calcined brusite; Calcined magnesia	1309-48-4	0.089
Sodium oxide	-	1313-59-3	0.378
Manganese(II) oxide	Manganese Green; Manganous oxide; Manganosite; Manganese protoxide; Rosensthiel Green; Natural manganosite	1344-43-0	0.007
Silicon dioxide	-	7631-86-9	6.82
Water	-	7732-18-5	90.345

4. First aid measures

A. Eye Contact

- Immediately flush eyes with plenty of water for at least 15 minutes by lifting the eyelids.
- Do not rub or rub your eyes.
- Seek medical attention if irritation occurs or persists.

B. Skin Contact

- Take off contaminated clothing and shoes and immediately wash with soap and water for at least 15 minutes.
- Wash clothes and shoes thoroughly before reuse.
- Get medical attention immediately.

C. Inhalation

- If exposed to large amounts of steam or mist, move to a place with fresh air.
- Keep warm in a position comfortable for breathing.
- If you feel unwell, seek medical attention.
- If breathing is irregular or stopped, administer artificial respiration and provide oxygen.

D. Ingestion

- Avoid all ingestion and do not induce vomiting.
- Rinse mouth immediately with water.
- If unconscious, turn head to side to prevent airway obstruction.
- Get medical attention immediately.

E. Indication of immediate medical attention and notes for physician

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- Let medical personnel know about the substance and take protective measures.
 - Show this material safety data sheet to your doctor.

5. Fire-Fighting measures

A. Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media: powder fire extinguishing agent, CO₂, general foam, water spray
- Unsuitable extinguishing media : No data

B. Specific hazards arising from the chemical (e.g. nature of any hazardous combustion products)

- No data

C. Special protective equipment and precautions for fire-fighters:

- Protective equipment to be worn: In case of fire, use an air respirator and full-body protective clothing (heat-resistant protective clothing).
- Move the material and container from the fire area if it can be done without risk.
- Prevent unauthorized persons from approaching and prohibit entry to dangerous areas.
- Notify the fire department and inform the location of the fire and its harmful characteristics.
- Keep upwind and avoid lowlands.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedure:

- No action shall be taken involving any personal risk or without suitable training.
- Evacuate to the surrounding area.
- In case of insufficient ventilation, use respiratory protection.
- Avoid heat, flames, sparks and other sources of ignition.
- Ensure adequate ventilation.
- Do not touch or contact the leaking material with your hands.

B. Environmental precautions:

- Avoid leakage into the environment.
- Prevent wastewater from entering drains, sewers or watercourses.

C. Methods and material for containment and cleaning up:

- In case of leakage, wear protective glasses, protective gloves and protective clothing and purify.
- Isolate the exposure area and control access other than those concerned.
- Collect and dispose of spilled material in a suitable container for later disposal.

7. Handling and storage

A. Precautions for safe handling:

- Do not eat, drink or smoke when using.
- Wear suitable personal protective equipment.
- Wash hands thoroughly after handling.
- Wash contaminated clothing before reuse.
- Do not eat, drink or smoke when using.
- Avoid spillage, contact with skin and eyes, and direct inhalation of spray and mist.
- Provide good ventilation.

B. Conditions for safe storage (including any incompatibilities):

- Store and store in original container.
- Store away from incompatible substances (see section 10 of this MSDS).
- Seal and store in a dry and cool place in a well-ventilated place.
- Store away from heat, sparks and open flame.

8. Exposure controls & personal protection

A. Control parameters (e.g. occupational exposure limit values, biological limit values):

Maintain the workplace below the exposure limit value.

Chemical name	TWA		STEL	
	ppm	mg/m ³	ppm	mg/m ³
Calcium oxide	-	2	-	-
Aluminium oxide	-	10	-	-
Titanium dioxide	-	10	-	-
Diiron trioxide	-	5	-	-
Dipotassium oxide	-	-	-	-
Magnesium oxide	-	10	-	-
Sodium oxide	-	-	-	-
Manganese(II) oxide	-	-	-	-
Silicon dioxide	-	-	-	-
Water	-	-	-	-

■ ACGIH

- Calcium oxide : TWA 2 mg/m³
- Aluminium oxide : TWA 10 mg/m³

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- Titanium dioxide : TWA 10 mg/m³
 - Magnesium oxide : TWA 10 mg/m³

B. Appropriate engineering controls:

- Check if the work process meets the Ministry of Labor's acceptance standards and exposure standards.
- Install a ventilation system such as a local ventilation system and manage to maintain an appropriate controlled wind speed.
- Install emergency eye wash basins and safety showers adjacent to use or handling areas.

C. Personal protective equipment

- Respiratory protection:
 - Wear respiratory protective equipment certified by NIOSH and Korea Occupational Safety and Health Agency.
- Eye protection:
 - If possible, wear safety glasses or protective goggles.
 - Wear safety glasses and face shields to protect eyes and face (front of head, forehead, chin, front of neck, nose, mouth) from various flying objects and harmful liquids generated during work.
 - Wear suitable chemical resistant PVC gloves.
- Hand protection:
 - Wear protective gloves which are certified by NIOSH and the Health and Safety Authority.
 - Wear chemical resistant protective gloves to avoid direct contact with chemicals.
- Body protection:
 - Wear chemical resistant protective clothing to prevent skin exposure.

9. Physical and chemical properties

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|---|---------|
| A. Appearance(Form, Color etc): | |
| - Form | Liquid |
| - Color | No data |
| B. Odour | No data |
| C. Odour threshold: | No data |
| D. pH: | No data |
| E. Melting point/freezing point: | No data |
| F. Initial boiling point and boiling range: | No data |
| G. Flash point: | No data |
| H. Evaporation rate: | No data |
| I. Flammability (solid, gas) : | No data |

J. Critical values for explosion :	No data
K. Vapour pressure:	No data
L. Solubility:	No data
M. Vapour density:	No data
N. Relative density :	No data
O. Partition coefficient: n-octanol/water:	No data
P. Ignition temperature :	No data
Q. Decomposition temperature:	No data
R. Viscosity :	No data
S. Molecular mass	No data

10. Stability and reactivity

A. Chemical stability and Possibility of hazardous reactions

- Stable under normal temperature and pressure conditions

B. Conditions to avoid

- humid place
- Avoid heat, flames, sparks and other sources of ignition.
- Avoid places that can generate toxic and corrosive decomposition products.

C. Incompatible materials

- Combustible substances, oxidizing agents

D. Hazardous decomposition products

- No data

11. Toxicological information

A. Information on the likely routes of exposure

- No data

B. Health hazards information

- Acute toxicity : No data
 - Oral : ATE > 62,371.1 mg/kg
 - 1305-78-8 : LD50 > 2,000mg/kg(rat) [Source: ECHA]
 - 1309-37-1 : LD50 > 2,000mg/kg(rat) [Source: ECHA]
 - 1344-43-0 : LD50 > 2,000mg/kg(rat) [Source: ECHA]
 - 7631-86-9 : LD50 > 5,000mg/kg(rat) [Source: ECHA]
 - Inhalation : ATE > 48.4 mg/L
 - 1344-28-1 : Dust LC50 > 2.3mg/L (4hr, rat) [Source: ECHA]

- 13463-67-7 : LC50 5.09mg/L (4hr, rat) [Source: ECHA]
- 1309-37-1 : Dust LC50 5.05mg/L (4hr, rat) [Source: ECHA]
- 1344-43-0 : Dust LC50 > 5.35mg/L (4hr, rat) [Source: ECHA]
- 7631-86-9 : LC50 > 5.01mg/L (4hr, rat) [Source: ECHA]
- Dermal: ATE > 28,925.1 mg/kg
- 1305-78-8 : LD50 > 2,500mg/kg(rabbit) [Source: ECHA]
- 7631-86-9 :LDC50 > 2,000mg/kg(rabbit) [Source: ECHA]
- Skin corrosive/irritant:
 - 1305-78-8 : Not skin corrosive [Source: ECHA]
 - 12136-45-7 : skin corrosive [Source: ICSC]
- Serious eye damage/eye irritation:
 - 1305-78-8 : Eye damage confirmed in tests using rabbits [Source: ECHA]
 - 12136-45-7 : eye damaging substances [Source: ICSC]
 - 1344-43-0 : slightly irritating [Source: ECHA]
- Respiratory: No data
- Skin sensitization:
 - 7681-52-9 : not cause skin sensitization [Source: ECHA]
- Carcinogenicity:
 - 13463-67-7 : carcinogenicity 2 [Source: Public Notice No.2023-9 of the Ministry of Labor], Group 2B [Source: IARC], Group A4 [Source: ACGIH]
 - 1309-37-1 : Group 3 [Source: IARC], Group A4 [Source: ACGIH]
- Germ Cell Mutagenicity: No data
- Reproductive toxicity: No data
- Specific target organ toxicity (single exposure):
 - 1305-78-8 : Inhalation of dust causes inflammation of the airways and pneumonia. Perforation of the esophagus and stomach [Source: HSDB]
 - 1309-37-1 : Causes respiratory irritation [Source: ICSC]
- Specific target organ toxicity (repeated exposure):
 - 1305-78-8 : As a result of repeated 90-day inhalation toxicity test (OECD TG413) using rats, some morphological changes in bronchial epithelial mucosal cells were observed, and lung weight increased. [Source: ECHA]
 - 1344-28-1 : Nodular pulmonary fibrosis observed, extensive alveolar proteinosis developed [Source: ECHA]
 - 13463-67-7 : Lung inflammation, lung cell proliferation, and macrophage dysfunction were confirmed. [Source: ECHA]
 - 1309-37-1 : It has been reported that repeated inhalation exposure in humans can cause

respiratory effects (e.g., emphysema) and cause metal fume fever. [Source: ICSC]

- Aspiration hazard: No data

12. Ecological information

A. Aquatic and terrestrial ecotoxicity

- Fish:
13463-67-7 : LC50 155mg/L(96hr, Oryzias latipes) [Source: ECHA]
- Invertebrates:
13463-67-7 : NOEC 10mg/L(Daphnia magna) [Source: ECHA]
- Aquatic algae:
1305-78-8 : EC50 > 14mg/L(72hr, Desmodesmus subspicatus) [Source: ECHA]
1344-28-1 : NOEC >= 0.103mg/L(72hr, Raphidocelis subcapitata) [Source: ECHA]
7631-86-9 : EC50 > 173.1mg/L (72hr, Desmodesmus subspicatus) [Source: ECHA]

B. Persistence and degradability

- Persistence:
7681-52-9 : -3.42 log Kow(20°C) [Source: ECHA]
- Degradability: No data

C. Bioaccumulative potential

- No data

D. Mobility in soil

- No data

E. Other adverse effects

- No data

13. Disposal considerations

A. Disposal methods

- Dispose of in accordance with the Waste Management Act.

B. Disposal precaution (including the disposal method of contaminated container and packaging)

- Observe waste management laws.

14. Transport information

A. UN Number

- Not Applicable

B. UN proper shipping name

- Not Applicable

C. Transport hazard class
- Not Applicable
D. Packaging group(if applicable)
- Not Applicable
E. Marine pollution (yes/no)
- No
F. Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises
- Not Applicable

15. Regulatory information

A. Industrial Safety and Health Act:
Product :
- 1305-78-8 : Exposure limit set substance
- 1344-28-1 : Hazardous substances subject to management, Substances subject to special health examination(12months), Harmful factors subject to work environment measurement(6 months, In case of metal dust, fume, etc.), Exposure limit set substance
- 13463-67-7 : Hazardous substances subject to management, Harmful factors subject to work environment measurement(6 months), Exposure limit set substance
- 1309-37-1 : Hazardous substances subject to management, Substances subject to special health examination(12 months), Harmful factors subject to work environment measurement(6개월), Exposure limit set substance
- 1309-48-4 : Hazardous substances subject to management, Harmful factors subject to work environment measurement(6 months), Exposure limit set substance
- 1344-43-0 : Hazardous substances subject to management, Substances subject to special health examination(12months, Manganese and its inorganic compounds), Harmful factors subject to work environment measurement(6 months, Manganese and its inorganic compounds), Exposure limit set substance, Substances that set acceptance criteria
- 7631-86-9 : Substances subject to special health examination(24 months, mineral dust), Harmful factors subject to work environment measurement(6 months, mineral dust)
B. Chemical Control Act:
- Not applicable
C. Dangerous Material Safety Control Act:
- Not applicable
D. Wastes Management Act:

Product : No data

- 1305-78-8 : designated waste
- 1344-28-1 : designated waste
- 1309-37-1 : designated waste
- 12136-45-7 : designated waste
- 1309-48-4 : designated waste
- 1313-59-3 : designated waste
- 1344-43-0 : designated waste
- - 7631-86-9 : designated waste

E. Other requirements in domestic and other countries:

- Not applicable

16. Other information

A. Information sources and references

- ECHA (The European Chemicals Agency)
- KOSHA (Korea Occupational Safety and Health Agency)
- HSDB(Hazardous Substances Data Bank)

B. Issuing date

- Date of initial revision: July 3th, 2023

C. Revision number and date

- Revision number: 0
- Date of initial revision: July 3th, 2023

D. Others

- This Safety Data Sheet is prepared based on the form of Article 110 of 『OCCUPATIONAL SAFETY AND HEALTH ACT』 and Public Notice No.2023-9 of the Ministry of Labor [Appendix 4]. Therefore, please be informed that it cannot be used for commercial purposes without prior permission
- This Safety Data Sheet is intended to assist the material safety handler (purchaser, handler, etc.) and should be noted that there is no warranty, no technical or legal liability for use, commercial application or expression in combination with special purpose or other materials.