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1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

- 1) Product identifier: NaSH
- 2) Relevant identified uses of the substance or mixture and uses advised against:
 - Absorption and sorbent, intermediate
- 3) Manufacture/Supplier/Distributor information:
 - Manufacture information:
 - Company name: ISU CHEMICAL CO., LTD
 - Address: 8, Seokdang-gil, Onsan-eup, Ulju-gun, Ulsan, Korea
 - Emergency telephone number: Tel. +82 52 231 5587 Fax. +82 52 231 5699

2. HAZARD IDENTIFICATION

- 1) Hazard classification: Acute toxicity (oral) Cat.3
 Skin corrosion/irritation Cat.1
 Serious eye damage/eye irritation Cat.1
 Acute aquatic environmental hazards Cat.1
- 2) Allocation label elements including precautionary statements
 - Hazard pictograms




 - Signal word
 - Danger
 - Hazard statements
 - H301 : Toxic if swallowed.
 - H314 : Causes severe skin burns and eye damage.
 - H318 : Causes severe eye damage.
 - H400 : Very toxic to aquatic life
 - Precautionary statements
 - Prevention
 - P260 : Do not breathe dust(Dust, fume, gas, mist, vapors, spray).
 - P264 : Wash thoroughly after handling.
 - P270 : Do not eat, drink or smoke when using this product.
 - P273 : Avoid release to the environment
 - P280 : Wear protective gloves/protective clothing/eye protection/face protection.
 - Response
 - P310 : Immediately call a POISON CENTER or doctor / physician.
 - P321 : First aid measures such as washing your skin and eyes with water
 - P330 : Wash your mouth.
 - P363 : Wash contaminated clothing before reuse.

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- P391 : Collect spillage
 - P301+P310 : If swallowed, seek medical advice immediately.
 - P301+P330+P331 : If swallowed, wash your mouth. Do not try to vomit.
 - P302+P352 : IF ON SKIN: Wash with plenty of soap and water.
 - P303+P361+P353 : If skin (or hair) gets on the skin, remove or remove all contaminated clothing. Wash skin with water / shower.
 - P304+P340 : If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing.
 - P305+P351+P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 - P337+P313 : If eye irritation persists get medical advice/attention.
 - Storage
 - P405 : Store in lockable storage area.
 - Disposal
 - P501: Dispose of contents container according to applicable regulations.
- 3) Other hazards: NFPA Grade: Health 3, Fire 2, Safety 1

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	Commonname	CAS No.	Concentration(wt%)
Sodium hydrogen sulfide	SODIUM SULFIDE	16721-80-5	<32
sodium carbonate	OHS40172;	497-19-8	<0.2
Sodium Sulfide	SODIUM SULFIDE (NA ₂ S)	1313-82-2	<0.1
Water	DIHYDROGEN OXIDE	7732-18-5	67~68

4. FIRST AID MEASURES

- 1) Following eye contact
 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 - Get emergency medical attention. Following skin contact:
- 2) Contact with skin
 - If it gets on the skin (or hair), remove or remove all contaminated clothing. Wash skin with water / shower.
 - If you feel uncomfortable, seek medical advice (doctor).
 - Wash contaminated clothing before reuse.
 - Get emergency medical attention.
 - Remove contaminated clothing and shoes and isolate contaminated areas.


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- Wash skin with soap and water.
- For hot substances, soak or rinse affected areas in cold water to remove heat.
- 3) Following inhalation
 - Seek immediate medical assistance.
 - Administer oxygen if breathing is difficult.
- 4) Following ingestion
 - IF SWALLOWED: Immediately call a POISON CENTER or doctor / physician.
 - If swallowed, wash your mouth. Do not try to vomit
 - If substance is ingested or inhaled, do not use artificial respiration using mouth-to-mouth method and use proper breathing medical equipment.
- 5) Advice to physician
 - Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
 - Symptoms caused by contact/intake may be delayed

5. FIRE FIGHTING MEASURES

- 1) Suitable (and unsuitable) extinguishing media:
 - Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
 - Use dry sand or earth to smother fire.
- 2) Special hazards arising from the substance or mixture:
 - The container may explode on heating.
 - Spills are a fire / explosion hazard.
 - Vapors may explode indoors, outdoors, and sewers.
 - Inhalation or contact with material may irritate or burn skin and eyes.
- 3) Special protective equipment for firefighters:
 - Rescuers should put on appropriate protective gear.
 - Evacuate area and fight fire from a safe distance.
 - Be careful because it can be carried in hot condition.
 - Move containers from fire area if you can do it without risk.
 - Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
 - Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.
 - Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
 - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
 - Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

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6. ACCIDENTAL RELEASE MEASURES

- 1) Health considerations and protective equipment:
 - Avoid breathing dust / fume / gas / mist / vapors / spray.
 - Do not breathe dust/fume/gas/mist/vapours/spray.
 - Clean up spills immediately, observing precautions in Protective Equipment section.
 - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
 - All equipment used when handling the product must be grounded.
 - Stop leak if you can do it without risk.
 - Please note that materials and conditions to be avoided.
- 2) Environmental precautions:
 - Avoid release to the environment.
 - Runoff may cause pollution.
 - Prevent entry into waterways, sewers, basements of confined areas.
- 3) For cleaning up:
 - Build up the levee and collect the water for digestion.
 - Absorb spillage with inert material (eg dry sand or earth) and place in a chemical waste container.
 - Absorb the liquid and scrub the area with detergent and water.

7. HANDLING AND STORAGE

- 1) Precautions for safe handling:
 - Wash thoroughly after handling.
 - Do not eat, drink or smoke when using this product.
 - Do not expose to pressure, cutting, welding, soldering, joining, punching, grinding or exposure to heat, flames, sparks, static electricity or other sources of ignition.
 - Contaminated work clothing should not be allowed out of the workplace.
 - Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
 - Handle / store carefully.
 - Do not breathe vapors from heated material.
 - Avoid prolonged or repeated contact with skin.
 - Please note that materials and conditions to be avoided.
 - Handling refer to engineering control/personal protection section.
- 2) Conditions for safe storage (including any incompatibilities):
 - Keep it at low temperature and avoid direct sunlight.
 - Keep a clearance between the loadings.
 - Keep away from other materials.
 - Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.

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- Please note that materials and conditions to be avoided.
- Keep container tightly sealed.
- Keep away from food and drink.
- Store in a dry place. Store in a closed container.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Chemical exposure limits, Biological exposure standard:

Components	Occupational exposure limits (Domestic)	ACGIH	Biological limit values
Sodium hydrogen sulfide	No data available	No data available	No data available
sodium carbonate	No data available	No data available	No data available
Sodium Sulfide	No data available	No data available	No data available
Water	No data available	No data available	Not applicable

2) Appropriate engineering controls:

- Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
- Install a local exhaust system, etc., and manage to maintain proper control wind speed.
- Install washout and safety shower for facilities that store or use this substance.

3) Personal protection equipment

○ Respiratory protection:

- Wear respirators that are certified by the Korea Occupational Safety and Health Agency according to the physical chemistry of exposed particulate matter.
- For particulate matter, the following respiratory protections are recommended: Filterable dust mask on the faciale filter mask (high efficiency particulate filter) or electric fan-attached dust mask (filter for dust, mist, and fume)
- If oxygen is deficient (<19.6%), wear an air mask or self-contained respirator.

○ Eye protection:


- Provide emergency showers and eyewash.
- Wear ventilated eyeglasses to protect the eyes from particulate matter that may irritate the eyes or cause other health problems.
- Install facilities and emergency shower facilities (shower type) near the workplace.

○ Hand protection:

- Wear protective gloves of appropriate materials considering the physical and chemical characteristics of chemicals.

○ Body protection:

- Wear protective clothing of appropriate materials considering the physical and chemical characteristics of chemicals.

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9. PHYSICAL AND CHEMICAL PROPERTIES

- 1) Appearance(Physical state, color, etc): yellow liquid
- 2) Odor: the smell of rotten eggs
- 3) Odor threshold: No data available
- 4) pH: 9.5
- 5) Melting point/freezing point: 44 – 48℃
- 6) Initial boiling point and boiling range: 100℃
- 7) Flash point: No data available
- 8) Evaporation rate: Non-inflammable
- 9) Flammability(solid, gas): Not applicable
- 10) Upper/lower flammability or explosive limits: No data available
- 11) Vapour pressure: 49.12 mmHg
- 12) Solubility(ies): 548 g/L at 20℃
- 13) Vapour density: No data available
- 14) Relative density: 15℃ 1.204 / 50℃ 1.186
- 15) n-octanol/water partition coefficient: -3.5
- 16) Auto ignition temperature: > 430℃
- 17) Decomposition temperature: 350℃
- 18) Viscosity: No data available
- 19) Molecular weight(mass): 56.06

10. STABILITY AND REACTIVITY

- 1) Stability and hazardous reactivity:
 - Unstable at room temperature.
 - Containers may explode when heated
 - Some may produce flammable hydrogen gas in contact with metal
 - Non-inflammable material itself is not burned, but it can be decomposed during heating, resulting in corrosive/toxic fume
 - Some may ignite flammable substances with oxidizer
 - Toxicity: inhalation, ingestion and skin contact can cause serious injury and death
 - contact with the melt may cause serious burns to the skin and eyes
 - Irritable, corrosive and toxic gases can be generated in case of fire
- 2) Conditions to avoid:
 - heat
 - Avoid contact with acidic fluids or overheating.
- 3) Incompatible materials:
 - acids, combustible materials
- 4) metalsHazardous decomposition products:
 - corrosive/toxic fume

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- irritant, corrosive, toxic gas.

11. TOXICOLOGICAL INFORMATION

1) Exposure route information

- burns, nausea, vomiting, shortness of breath, headache, dizziness, lung congestion, gastrointestinal benevolence, irregular heartbeat, Swallowing is harmful, mucous membrane burns in contact with skin, skin burns, irritations (severe cases), rash eye burns, irritation (severe cases), tear, blindness

2) Health hazard information

○ Acute toxicity:

- Oral: LD50 =105 mg/kg bw (Rat, OECD TG 401)
- Dermal: No data available
- Inhalation: No data available

○ Skin corrosion/Irritation:

- Strong alkaline substances at room temperature (pH 10.8 to 11.7): (OCI, 2021)

○ Serious eye damage/irritation:

- Strong alkaline substances at room temperature (pH 10.8 to 11.7): (OCI, 2021)

○ Respiratory sensitization:

- No data available

○ Skin sensitization:

- No data available

○ Carcinogenicity:

- No data available

○ Germ cell mutagenicity:

- In vitro Returning Strain Test: Negative (OECD 471) (Gelbke, 1989)
- Invitro gene mutation test: negative (OECD 476) (Read across: Disodium Sulphid) (V. Stone, 2010)
- Invivo : Negative (OECD 474) (Read across: Disodium Sulphid) (Goke, 1981)

○ Reproductive toxicity:

- No reproductive development toxicity or abnormalities were observed (RAT, OECD 421) (Dorman et al, 2004)

○ Specific target organ toxicity (single exposure):

- No data available

○ Specific target organ toxicity (repeated exposure):


- NOAEL: 14 mg/L (Rat, Dorman et al, 2004)

○ Aspiration hazard:

- No data available

○ Other harmful effects :

- No data available

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12. ECOLOGICAL INFORMATION

- 1) Aquatic toxicity:
 - Fish: LC50(96h) 0.003 mg/L(mc) (OECD 203) (Read across: H2S), (Yusoff FM et al, 1998)
NOEC(826 d) 0.005 mg/L(mc) (Read across: H2S), (Smith LL Jr., et al, 1976)
 - Crustacean: LC50(48h) 4,580 mg Na2SO4/L (US EPA guidelines) (Read across: H2S), (Mount DR, Gulley DD, Hockett JR, Garrison TD, Evans JM (1997))
 - Aquatic algae: EC50 (120h) 1,900 mg/L (mc) (similar to OECD 201) (Patrick R, Cairns J Jr, Scheier A, 1968)
- 2) Persistence and degradation:
 - Residue : No data available
 - Degradable : COD 1600 mg/l
- 3) Bioaccumulative potential:
- 4) - Concentration : 3.162
 - Biodegradable : No data available
- 5) Mobility in soil: No data available

13. DISPOSAL CONSIDERATIONS


- 1) Disposal methods:
 - Dispose of contents/container to the waste control act.
- 2) Precautions (including disposal of contaminated container of package):
 - Regulations precautions indicated in Waste Management Act should be considered.

14. TRANSPORT INFORMATION

- 1) United Nations Number: 2949
- 2) UN Proper Shipping Name : SODIUM HYDROSULPHIDE, HYDRATED with not less than 25% water of crystallization
- 3) Hazard rating in transport : Class 8
- 4) Packaging grades: (if applicable) : II
- 5) Marine pollutant: Not applicable
- 6) Special safety response for transportation or transportation measure:
 - Emergency measures in case of fire : F-A
 - Emergency measures in case of spill : S-B

15. REGULATORY INFORMATION

- 1) Occupational Safety and Health Act in Korea: Not applicable
- 2) Chemicals Control Act in Korea: Not applicable


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- 3) Safety Control of Dangerous Substances Act in Korea: Not applicable
- 4) Wastes Control Act in Korea: Designated waste
- 5) Other regulations in KOREA and Abroad regulations:
 - Other regulation (Domestic):
 - Persistent Organic Pollutants (POPs) Control Act: Not applicable
 - National regulations:
 - U.S.A. management information(OSHA regulation): Not applicable
 - U.S.A. management information(CERCLA regulation): Not applicable
 - U.S.A. management information(EPCRA 302 regulation): Not applicable
 - U.S.A. management information(EPCRA 304 regulation): Not applicable
 - U.S.A. management information(EPCRA 313 regulation): Not applicable
 - U.S.A. management information(Rotterdam Convention on Substances): Not applicable
 - U.S.A. management information(Stockholm Convention on Substances): Not applicable
 - U.S.A. management information(Mont- real Protocol on Substances): Not applicable
 - EU Classification (Classification): Not applicable
 - EU Classification (Risk Phrases): Not applicable
 - EU Classification (Safety Phrases): Not applicable

16. OTHER INFORMATION

- 1) Reference:
 - Korea Occupational Safety & Health Agency MSDS
 - IMDG Code
 - OECD SIDS
 - ChemWATCH
 - IUCLID
 - HSDB
 - IARC
 - ECOTOX
 - NITE
 - Recommendations on the transport of dangerous goods
 - NCIS
 - Emergency response guide book
 - ECOSAR
 - QSAR
 - EU RAR
 - The Chemical Database
 - ICSC
 - RTECS
 - NIOSH Pocket guide

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<ul style="list-style-type: none"> • ESIS • ECHA CHEM • HPVIS <p>2) Print date: 2011. 04. 07</p> <p>3) Number of revised/Date of last revision: 5 / 2022. 02. 24</p> <p>4) Other: No data available</p>
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