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MSDS NO: AA00258-0000000001

1. Product and Company Identification

- A. Product name : 98%-Sodium Hydroxide (flake)
- B. Relevant identified uses of the substance or mixture and uses advised against
- Recommended Use¹⁾ : 3. Adsorbents
 - 18. Various process aids (pH regulator, neutralizing agent, etc.),
 - 47. Food and food additives
 - Standards for the use of sodium hydroxide for food additives
 - : Sodium hydroxide should be neutralized or removed prior to completion of final food product
 - Usage Limits : Material composed of Al, Zn, Sn, and Cu rapidly corrodes when in contact with caustic soda (sodium hydroxide), and therefore should be avoided; do not use for purposes other than those recommended.
- C. Manufacture / Supplier/ Distributor information
- Company : Youngjin co. Ltd.
 - Address : 38, Ojeong-ro, Ojeong-gu, Bucheon-si, Gyeonggi, Korea
 - Department : Quality Control Department
 - Telephone : 82-32-674-4221

2. Hazards Identification ²⁾

- A. Hazards Identification Classification³⁾
- Metal corrosive substances classification 1
 - Acute toxicity : dermal toxicity classification 4
 - Skin corrosive or irritative substance classification 1
 - Serious eye damage/ eye irritation : Category 1
- B. Warning marks
- Pictorial symbol



4)




5)

1) Ministry of Employment and Labor Notification No. 2020-130, Attached Table 5. The classification system for use (Article 11)

2) National Institute of Environmental Research, Chemical Information System

3) National Institute of Environmental Research, Chemical Information System

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○ Signal word: Danger

○ Hazardous expression

H290 Causes corrosion of metal.

H312 Skin contact is hazardous.

H314 Causes severe skin burns and eye damage.

H318 : Causes serious eye damage

○ Precaution expression

P234 Store only in the original container.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P264 Wash thoroughly after handling

P280 Wear protective gloves/protective clothing/ eye protection/face protection.

○ Respond

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340 IF INHALED: Remove victim 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.

P310 Immediately call a POISON CENTER or doctor/physician.

P363 Wash contaminated clothing before reuse.

P390 To prevent damage to substances, absorb leaked material.

○ Storage

P405 Store locked up.

P406 As this material causes corrosion of metal, store in corrosion-resistant containers that the manufacturer or concerned authority specified.


○ Disposal

P501 Dispose of container according to relevant regulations.

C. NFPA Rating (0-4 level): Health=3, Fire=0, Reactivity=1

4) Standards for classification and labeling of chemical substances and material safety data sheets, Article 6-2 (Methods of Drawing Up Warning Signs) 2.If both pictograms for skin corrosion or serious eye damage, and skin irritation or eye irritation are applicable, only the pictogram for skin corrosion or serious eye damage shall be indicated(2023.1.5.)

5) dermal toxicity classification 4

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3. Composition, Information on Ingredients⁵⁾

Chemical Name	Idiomatic name	Percent (%)	CAS No.	KE No.	UN No.	EU No.
SODIUM HYDROXIDE	Sodium Hydroxide (Caustic Soda)	98%	1310-73-2	KE-31487	1823	215-185-5

4. First Aid Measures

A. Eye Contact

- Take emergency medical service.
- Rinse cautiously with water for several minutes. Remove contact lenses, continue rinsing.
- If eye irritation continues, consult medical personnel.

B. Skin Contact

- Prevent spread of contaminated area if skin contact is slight.
- Take emergency medical service.
- If exposed, consult medical personnel.
- Wash contaminated clothing thoroughly before re-use.
- If the material is hot, soak affected area in a great quantity of cold water and wash to remove heat.
- If on skin (or hair), take off immediately all contaminated clothing. Rinse skin with water/shower.
- If uncomfortable, consult medical personnel.
- Remove contaminated clothing and shoes. Isolate contaminated area.

C. Inhalation

- Consult medical personnel immediately


D. Ingestion

- Take emergency medical service.
- if exposed, consult medical personnel.
- If the person ingested or inhaled the material, do not mouth-to-mouth resuscitation and use proper medical respiratory equipment.
- If swallowed, wash mouth out and do not induce vomiting.

E. Other medical notices.

5) Major amendments to the legal system in the 「material safety data sheet」: p5

1. 1) Ingredients: Only harmful substances and hazardous substances are listed.

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- Symptoms by Inhalation or contact may be delayed.
- Let medical personnel recognize the material and take protective measure.

5. Explosion / Fire Fighting Measures

A. Appropriate (and inappropriate) Extinguishing Media

- Use alcohol foam, carbon dioxide or water spray.
- If extinguishing by smothering, use dry sand or earth.

B. Specific Hazards in Presence of Chemical Substances


- If boiled, container may explode.
- Toxicity: Inhalation, ingestion, skin contact can cause severe injuries and death.
- Nonflammable, but material can decompose and generate corrosive and toxic fume if boiled.
- Contact with molten material can cause severe skin and eye burn.
- Contact with metal causes inflammable hydrogen gas partly.
- As oxidizer, the material may ignite inflammable materials partly.
- While burning, thermal decomposition or combustion can generate irritative and highly hazardous gas.

C. Precaution and Protective equipments for Fire Fighting

- Rescuer should use appropriate protective equipment.
- Dig a ditch to dispose fire fighting water and keep material not dispersed.
- Keep water out of container.
- If not dangerous, move container from fire area.
- Keep proper distance while extinguishing.
- Fire involving Tanks; After extinguish, cool down container with water spray for considerable time
- Fire involving Tanks; Step back immediately if pressure relief device makes loud sound or tank discolors.
- Fire involving Tanks; Extinguish fire in maximum range or use unmanned fire apparatus in case of tank fires.
- Fire involving Tanks; Do not approach tank in flames.

6. Accidental Release Measures

A. Require measures and protection to protect human body

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- Do not inhale dust, smoke, gas, mist, steam, spray.
- Do not enter if not needed, or if protection equipment is not prepared.
- Remove all ignition sources.
- Clear spilth immediately, follow precaution of Personal Protection section.
- Isolate contaminated area.
- Keep water out of container.
- If not dangerous, stop any leakage.
- Do not touch broken container or leaked material without appropriate protective clothing.
- Take notice of material and condition to avoid.

B. Required measures to protect environment

- leaked material is corrosive and toxic, and can cause contamination.
- Prevent of inflow into waterway, drain, basement, or closed space.

C. Purification or removal method

- Absorb spilth with inactive material(e.g. dry sand or earth), put into chemical waste container.
- Absorb spilt liquid and wash out contaminated area with detergent and water.


7. Handling & Storage

A. Safe handling

- Do not inhale steam generated from heated material.
- Open cap carefully.
- Work in reference to Engineering Controls and Personal Protection
- Follow all precautions of MSDS/LABEL though container is emptied. Product residues can rest.
- While using this product, do not eat, drink, and smoke.
- Prevent long term or continuous skin contact.
- Do not enter storage area without appropriate ventilation.
- Wash thoroughly after handling.
- Use carefully taking notice of Handling & Storage.
- Pay attention to Conditions and Materials to Avoid.
- Use only in well ventilated place.

B. Safe Storage

- Drain the water out from an empty drum and close properly and put it back to drum regulator or place appropriately.
- Keep away from food and beverage.
- Store in locked storage.

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- Pay attention to Conditions and Materials to Avoid.

8. Exposure Controls & Personal Protection⁷⁾

A. Chemical Exposure Limits, Biological Exposure Limit

Korean Regulation	STEL - C 2mg/m ³ ⁸⁾
ACGIH Regulation	STEL - C 2mg/m ³
Biological Exposure Limit	No data available

B. Engineering Controls

- Install local exhaust ventilation, use process isolation or other ways to comply tolerable standard.
- Install facility to clean and wash up nearby working place for emergency.

C. Personal Protective Equipment

○ Respiratory Protection

- Use respiratory protective equipment that is appropriate to exposed material's physical & chemical properties and authorized by Korean Occupational Safety and Health Act.

○ Eyes Protection

- Install washing and emergency shower facility near working place.
- Wear safety glasses and safety mask to protect against chemicals.

○ Hands Protection

- Wear appropriate chemical-resistant gloves

○ Body Protection

- Wear appropriate chemical-resistant apron and boots.

9. Physical & Chemical Properties


A. Appearance: Odorless, White color or colorless deliquescent solid

B. Odor: None.

C. Odor Threshold : None

⁷⁾ KOSHA


⁸⁾ According to the exposure criteria for chemicals and physical factors, STEL (short-term exposure limit, 15-minute time-weighted average, exposure concentration must exceed the time-weighted average exposure standard (TWA)). If you are below the short-term exposure threshold (STEL), the duration of one exposure should be less than 15 minutes, this condition should occur less than 4 times a day, and each exposure interval should be at least 60 minutes. The Ceiling exposure standard (C) refers to the standard workers should not be exposed to, even for a short period.

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- D. PH: 0.05% solution pH12
0.5% solution pH 13
5% solution pH 14
- E. Melting point/Freezing point: 318°C
- F. Initial Boiling point and Boiling point range: 1390°C
- G. Flash point: No data available
- H. Evaporation Rate
- I. Flammability (solid, gas): nonflammable
- J. Low & Upper limit of Flammable or Explosion Range: N/A.
- K. Vapor Pressure: 1mmHg at 739°C
- L. Solubility: (1)109g/ 100ml at 20°C
(2) soluble in alcohol glycerol
- M. Vapor Density: No data available
- N. Specific Gravity: 2.1
- O. n-Octanol/water partition coefficient: -3.88(estimated)
- P. Auto-ignition Temp.: nonflammable.
- Q. Decomposition Temp.: No data available.
- R. Viscosity: 4cP at 350°C
- S. Molecular Weight / Molecular Formular: 40.00 / NaOH

10. Stability & Reactivity

- A. Chemical stability and Possibility of hazardous reactions
- Material can decompose and generate toxic gas at high temperature.
 - If boiled, container may explode. Contact with metal causes inflammable hydrogen gas partly.
 - Material is nonflammable and does not burn itself, but can decompose and generate corrosive and toxic fume if boiled.
 - As oxidizer, the material may ignite inflammable materials partly.
 - Toxicity: Inhalation, ingestion, skin contact can cause severe injuries and death.
 - Contact with melting material can cause severe skin and eye burn.
 - Fire causes irritative, corrosive, toxic gas from material.
- B. Conditions to Avoid : Heat
- C. Materials to Avoid : Inflammable materials, reductive materials.
- D. Hazardous Decomposition Products :
- While burning, thermal decomposition or combustion can generate irritative and highly

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poisonous gas.

- Corrosive and toxic fume.

11. Toxicological Information

A. Information about possible exposure route⁹⁾ :

- Short-term affection of inhalation through respiratory : Cause irritant to airway and edema of the lungs.
- Short-term affection of skin contact : Severe corrosion and skin necrosis.
- Short-term affection of Eye contact : Cause severe damage to eyes, corrosion, conjunctivitis, corneal clouding.

B. Health effect : No data available

○ Acute oral toxicity¹⁰⁾¹¹⁾:

- oral : No data available
- SKIN : Classification 4 LD50=1350mg/kg bw (Rabbit)
- Inhalation : No data available

○ Skin corrosivity or irritation : Category 1

Skin corrosion / irritation test in rabbits showed irritation (pH> 14) (OECD TG 404, KOSHA)

Strong stimulation [Standard draize test]: 500mg/24hr(rabbit) (National Institute of Environmental Research, Toxic Information Summary 2p)

○ Severe eye damage or irritation : Category 1

Severe eye damage / irritation in rabbits showed severe conjunctival irritation (PH>14)

(OECD TG 405, KOSHA)

Strong stimulation [Standard draize test]: 1%(rabbit) (National Institute of Environmental Research, Toxic Information Summary 2p)

Weak stimulation [Standard draize test]: 400μg(rabbit)

Strong stimulation [Standard draize test]: 50μg/24/hr(rabbit)

Strong stimulation [Standard draize test]: 1mg/24hr(rabbit)

○ Respiratory sensitization : No data available

○ Skin sensitization : Not found on human body.


○ Carcinogenesis

- Occupational Safety and Health Act : No data available
- Ministry of Employment and Labor : No data available

9) Summary of Chemical Information System, Hazardous Substance Properties, Toxicity, and Control Information 2p

10) Summary of Chemical Information System, Hazardous Substance Properties, Toxicity, and Control Information 2p

11) KOSHA

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- IARC : No data available
- OSHA : No data available
- ACGIH : No data available
- NTP : No data available
- EU : No data available
- CLP : No data available
- Gamete Mutagenicity : Not classified
 - The result of the Reverse mutation Assay using microorganisms in the test tube is negative regardless of the presence or absence of metabolic activators.
 - As a result of the chromosomal abnormality test using mammalian cultured cells in vitro, it is positive if there is a metabolic activating system / negative if there is no metabolic activating system. (It appears to be due to the formation of chromosomal abnormalities in the S9 product)
 - The result of the 'a micronucleus test' using mammalian red blood cells in vivo is negative. (KOSHA)
- Reproductive toxicity : No data available
- Specific target organ toxicity (single exposure) : Irreversible obstructive damage was observed in the lungs of 25-year-old women who worked for one day in a room with insufficient ventilation and inhaled 5%-NaOH as an aerosol, but the evidence was inadequate (OECD, SIDS & (Hansen et al., 1991)
- Specific target organ toxicity (repeated exposure) : No data available
- Aspiration Hazard : No data available

12. Ecological Information ¹²⁾

A. Aquatic & Eco-toxicity:

- Fish : 96hr-LC₅₀(Oncorhynchus mykiss) = 125mg/l
- Crustacean : 48hr-EC₅₀(Daphnia magna) = 40.4mg/l
- Algae : No data available


B. Residue property and degradability

- Residue property : log Kow -3.88(estimated)
- Degradability : Photolysis half-life in the atmosphere is 13 seconds.

C. Bioaccumulative potential

- Bioaccumulation : Bioaccumulation is expected to be low according to the BCF <500 (BCF)=3.162(estimated)

¹²⁾ KOSHA

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- Biodegradation : Biodegradable (estimated)
- D. Movement in soil: Koc=13.2L/kg Possibility of movement in soil is low(estimated, based on logKow=-3.88)
- E. Ozone Layer Hazard : Not applicable.
- F. Other hazardous effect : No data available.

13. Disposal Considerations


- A. Disposal method
- If specified in Wastes Control Act, dispose material and container according to the regulation.
 - Dispose material by neutralization, oxidation, reduction reaction and by condensation, precipitation, filter, dehydration method.
 - Dispose by evaporation and condensation method.
 - Refine and dispose by separation, distillation, extraction, filter method.
 - If there is a hazard to sanitation or Environment-Health, report local health center, police station, and fire station to do necessary measure for prevention of hazards
- B. Disposal Considerations
- If waste is liquid mixed with waste alkali and etc, neutralize the waste first not to make disturbance to incineration, incinerate and bury in landfill.
 - Dispose carefully to avoid eyes or body contact of small drops of material jumping out from waste when watering down or neutralizing with acids.

14. Transport information

- A. UN Number ¹³⁾: 1823
- B. UN proper shipping name : SODIUM HYDROXIDE, SOLID
- C. UN hazardous ranking : 8
- D. Un package group : 2
- E. Marine pollutant : No data available
- F. Special precautions:
- In case of fire : F-A
 - in case of leakage : S-B

15. Regulatory Information


¹³⁾ National fire agency, national dangerous goods information system reversion(2023.1.5.)

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- A. Regulation by Occupational Safety and Health Act :
- Work environment monitoring : listed (6month cycle)
 - Hazardous Substances Requiring Management : listed
 - Occupational exposure limits : N/A
- B. The Chemicals Control Act : toxic substance ,
existing chemical substance subject to registration (KE-314787)
- C. Dangerous Material Safety Management Regulation : N/A
- D. Waste Control Act : Designated waste
- E. Other regulation by Korea and foreign acts
- Korean Regulation
Persistent organic pollutants control acts : N/A
 - Foreign Regulation
U.S.A management information(OSHA Regulation) : N/A
U.S.A management information(CERCLA Regulation) : 453.599kg 1000lb
U.S.A management information(EPCRA 302 Regulation) : N/A
U.S.A management information(EPCRA 304 Regulation) : N/A
U.S.A management information(EPCRA 313 Regulation) : N/A
U.S.A management information(Rotterdam Protocol) : N/A
U.S.A management information(Stockholme Protocol) : N/A
U.S.A management information(Montreal Protocol) : N/A
EU classification information(Classification) : Skin Corr. 1A
EU classification information(Risk Phases) : H314
EU classification information(Safety Phrases) : N/A

16. Other Information

- A. Data Source : Korean Occupational Safety and Health Act.
- B. Date of establishment : June, 3, 1996.
- C. Revision Number and recent revision date : Rev. No.12 / Jan. 5, 2023.
- D. Others :
- Hazards Identification(additional information) : Hazardous Substance Classification according to National Institute of Environmental Research notification No.2011-15 is as following.
 - Metal corrosive substances classification 1, Acute toxicity : dermal toxicity classification 4, Skin corrosive or irritative substance classification 1, Other applicable UN No. : 1823

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December 16, 2019 revision

- 2. Hazards Identification

H318 : Causes serious eye damage (ECHA C&L Inventory)

- 11. Toxicological Information

Acute oral toxicity: oral : No data available (toxicological information, OECD SIDS)

Skin corrosivity or irritation : Category 1 (KOSHA)

Severe eye damage or irritation : Category 1

(OECD SIDS, Chemicals information system toxicological information)

Specific target organ toxicity (single exposure) : Insufficient

15. Regulatory Information

Regulation by Occupational Safety and Health Act (KOSHA)

The Chemicals Control Act : Hazardous Substance (Chemicals information system)

EU classification information (KOSHA)

January 27, 2021 revision

Review and supplement the entire contents and indicate the source according to the revision of the Occupational Safety and Health Act

January 5, 2023 revision

Regulations on classification and labelling of chemicals

Notice No. 202264, Oct. 26, 2022, attached Table 4 Classification and labelling of the hazardous chemical substance (Regarding Article 13 Paragraph 1)