

SAFETY DATA SHEET

Date Printed: January 7, 2020

Version : 4th

Regulation: In accordance with Commission Regulation (EU) CLP 1272/2008

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1 Product identifier

Product name: Caustic soda (25%)

EC No. : 215-185-5

REACH Registration No.: 01-2119457892-27-0056

CAS No.: 1310-73-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Identified Uses

- Manufacture of Liquid NaOH
- Formulation : Industrial and professional use of NaOH
- Uses at industrial sites : use as solvent, process aid or intermediate in the manufacturing of pharmaceuticals and intermediates, Substance is used in neutralization reactions and as a pH regulator, Intermediate for synthesis under strictly controlled conditions, Industrial use of Sodium hydroxide as process aid in the plastics and paper industry, Alumina production and cleaning of equipment, Bayer process

1.2.2. Recommended use

- Raw material for metal and detergent, neutralizing agent

1.2.3. Restrictions on use

- 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.

1.3 Details of the supplier of the safety data sheet

Company name: Hanwha Solutions Co, Ltd. Yeosu plant

Address: Yeosu plant, Hanwha Solutions Co, Ltd., 117, Yeosusandan 3-ro, Yeosu-si, Jeollanam-do, Korea
Ulsan plant, Hanwha Solutions Co, Ltd., 141, Sanggae-ro, Nam-gu, Ulsan, Korea

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Email Address: honey12@hanwha.com

1.4. Emergency telephone number

Emergency Telephone: +82-10-9969-7873

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 (CLP)

Physical / Chemical Hazards:

Classification according to Regulation (EC) 1272/2008 (CLP):

Not classified

Health Hazards:

Classification according to Regulation (EC) 1272/2008 (CLP):

Skin corrosion/Irritation: Category 1A

Serious eye damage/eye irritation, Category 1

Environmental Hazards:
Classification according to Regulation (EC) 1272/2008 (CLP):

Not classified

2.2 Label elements
Hazard pictograms:

Signal word: Danger

Hazard statement:

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

Additional precautionary statements

EUH070 'Toxic by eye contact'

EUH071 'Corrosive to the respiratory tract'

Precautionary statements
- Precaution

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.

- Treatment

P301+P330+P331 If swallowed: Rinse mouth. Do not induce vomiting.

P303+P361+P353 If ON SKIN (OR HAIR): Remove/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.

P321 Specific treatment (see information on this label).

P363 Wash contaminated clothing before reuse.

- Storage

P405 Store locked up.

- Disposal

P501 Dispose the contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards
Health: 3

Flammability: 0

Reactivity: 1

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No.	EC No.	Conc. /%	Classification according to 1272/2008/EEC	(Pre) registration No.

Sodium hydroxide	1310-73-2	215-185-5	24.5 ~ 25.5	Skin Corr. 1A	-
Water	7732-18-5	231-791-2	74.5 ~ 75.5	Not classified	-

※ Specific concentration limits

Hazard class and category	Concentration limit %
Skin corrosion category1A	Base with pH ≥ 11,5
Serious eye damage/eye irritation, Category 1	

4. FIRST AID MEASURES

4.1 Description of first aid measures

4.1.1. General

information: Remove soiled or soaked clothing immediately, do not allow to dry.
Adhere to personal protective measures when giving first aid.
Clean body thoroughly (Bad, shower).

4.1.2. Following inhalation:

Move to fresh air.
Oxygen or artificial respiration if needed.
Call a physician immediately.

4.1.3. Following skin contact:

Take off contaminated clothing and shoes immediately.
Wash off immediately with plenty of water..
Call a physician or poison control centre immediately.

4.1.4. Following eye contact:

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
In the case of difficulty of opening the lids, administer an analgesic eye wash (oxybuprocaine).
Call a physician or poison control centre immediately.

4.1.5. Following ingestion:

Call a physician or poison control centre immediately.
If swallowed, rinse mouth with water (only if the person is conscious).
Do NOT induce vomiting.
Let plenty of water be drunk in small gulps.

4.1.5. Self-protection

of the first aider: First aider: Pay attention to self-protection!

4.2 Most important symptoms and effects, both acute and delay Acute effects :

- Symptoms and effect : Serious irritation to the eyes and corrosion to the skin

4.3 Indication of immediate medical attention and notes for physician

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

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

- Suitable extinguishing media: Use alcohol foam, carbon dioxide, dry fire extinguisher or water spray when fighting fires involving this material.

- Unsuitable extinguishing media: Not available

5.2 Special hazards arising from the substance or mixture

- Thermal decomposition products: Sodium Hydroxide fumes
- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.

5.3 Advice for firefighters

- Rescuers should put on appropriate protective gear.
- Evacuate area and fight fire from a safe distance.
- Dike fire-control water for later disposal; do not scatter the material.
- Move containers from fire area if you can do it without risk.
- Do not get water inside containers.
- 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.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- Clean up spills immediately, observing precautions in Protective Equipment section.
- Eliminate all ignition sources.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Cover with plastic sheet to prevent spreading.
- Please note that there are materials and conditions to avoid.-
- Avoid contact with skin, eyes and clothing.

6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.
- Do not discharge into the drains/surface waters/groundwater. Do not discharge into the subsoil/soil.

6.3 The methods of purification and removal

- Use water spray to reduce vapors. Call for assistance on disposal.
- Neutralize the residue with a dilute solution of acetic acid.
- Absorb spillage to prevent material damage.
- Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Absorb the liquid and scrub the area with detergent and water.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

- Wash thoroughly after handling.

- Use only outdoors or in a well-ventilated area.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Loosen closure cautiously before opening.
- Avoid prolonged or repeated contact with skin.
- Avoid breathing vapors from heated material.
- Do not enter storage area unless adequately ventilated.
- Please note that there are materials and conditions to avoid.
- Please work with reference to engineering controls and personal protective equipment.

7.2 Conditions for safe storage, including any incompatibilities

- Store locked up.
- Keep container tightly closed.
- Do not store together with acids.
- Do not use aluminium containers. Do not use zinc containers. Do not use lead containers.
- Use stainless steel containers. Use containers made of Polyethylene. Use rubberized containers. Use glass containers.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.
- Recommended storage temperature: 15 °C

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational Exposure limits

o EU regulation:

- Austria: Ceiling=2mg/m³
- Bulgaria: TWA=2mg/m³, Ceiling=2mg/m³
- Czech: TWA=1mg/m³, Ceiling=2mg/m³

o U.S regulation :

- NIOSH: Ceiling=2mg/m³
- OSHA: TWA=2mg/m³, Ceiling=2mg/m³

o ACGIH: Ceiling=2mg/m³

o Biological exposure index: Not available

o Others:

- Mexico: Ceiling=2mg/m³
- Philippines: TWA= 2mg/m³
- Singapore: STEL=2mg/m³

o DNELs, DMELs, PNECs :

Exposure route of relevance	DNELs, DMELs, PNECs											
	Industrial				Professional				Consumer			
	Long term, Local effects	Long term, systemic effects	Short term, local effects	Short term, systemic effect	Long term, Local effects	Long term, systemic effects	Short term, local effects	Short term, systemic effect	Long term, Local effects	Long term, systemic effects	Short term, local effects	Short term, systemic effect
Human: oral	-	-	-	-	-	-	-	-	-	-	-	-
Human: inhalation		1.0 mg/m ³	-	-		1.0 mg/m ³	-	-		1.0 mg/m ³	-	-

8.2 Exposure controls

Appropriate engineering controls:

- Facilities for storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Individual protection measures, such as personal protective equipment:

Respiratory protection:

- Wear European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment when necessary.

Eye protection:

- Wear enclosed face shield safety goggles to protect from gaseous state organic material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

Hand protection:

- Wear appropriate protective gloves (PVC, Neoprene, Natural Rubber, butyl-rubber) by considering physical and chemical properties of chemicals.

Body protection:

- Wear appropriate Alkali-resistant protective clothing by considering physical and chemical properties of chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance

Description :	Liquid
Color :	Colourless
Odor :	Odorless
Odor threshold :	Not available
pH :	>14
Melting point/freezing point :	-25°C ~ -28°C
Initial boiling point and boiling range :	106°C~110°C(20%)
Flash point :	Not available
Evaporation rate :	Not available
Flammability (solid, gas) :	Not flammable
Upper/lower flammability or explosive limits :	Not available
Vapor pressure :	1 mmHg (739°C)
Vapor density :	1.219 (25°C)
Relative density:	Not available
Solubility(ies):	52% (20°C), 42% (0°C)
Partition coefficient: n-octanol/water :	logKow=-3.88
Auto-ignition temperature :	Not auto-ignitable
Decomposition temperature :	Not available
Viscosity :	4.0cP (350°C)
Explosive properties :	Not available
Oxidising properties :	Not available

Molecular weight :

40g/mol

10. STABILITY AND REACTIVITY

10.1 Reactivity/Chemical stability/Possibility of hazardous reactions

- Flammable liquid and vapour.
- Catches fire spontaneously if exposed to air
- In contact with water releases flammable gas.
- May decompose at high temperatures into forming toxic gases.
- Unstable at room temperature.
- May violently polymerize and result in fire and explosion.
- May form explosive mixtures at temperatures at or above the flashpoint.
- Reacts violently with water, giving off flammable gas which may explode.
- Containers may explode when heated.

10.2 Conditions to avoid

- Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- Toxic gases may be accumulated in closed space.
- In contact with combustible materials, may ignites or exploded.

10.3 Incompatible materials

- Acetaldehyde, acids, acrolein, alleyl chloride, allyl alcohol+benzenesulfonic chloride, allyl chloride, aluminum, ammonia+ silver nitrate, ammonium salt, benzene-1,4-diol, bromine, chloride trifluoride, chloroform, chlorohydrin, chloride sulphate, copper, metal, zinc, in aqueous solution, evolves hydrogen with metals. etc.

10.4 Hazardous decomposition products

- Oxide of nitrogen

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects	
(a) Acute toxicity	Not classified
Oral	Rat, LD ₅₀ =140 ~ 340 mg/kg (Difficult to apply to classification due to low reliability.)
Dermal	Rabbit, LD ₅₀ =1,350mg/kg (Difficult to apply to classification due to low reliability.)
Inhalation	Not available
(b) Skin Corrosion/ Irritation	Category 1A (according to Regulation(EC) 1272/2008 (CLP))
	Occlusive 2 hour exposure to 1% w/v aqueous solution of Sodium hydroxide, produced very slight erythema in 2 animals at 1 hour reading. By the 24 hours reading a well defined reaction was observed in 1 animal and same very slight irritation in 2 other animals. Very slight irritation was seen in 3 animals at 48,72 hours and persisted in 1 animal to day 7. Based on the observations, Sodium hydroxide (E7171) is a very slight skin irritant.(pH>14, 25%)

(c) Serious Eye Damage/ Irritation	Category 1A(according to Regulation(EC) 1272/2008(CLP))
	A 2% NaOH solution caused moderate corneal injury (mean 2.0 for a maximum score of 4) which covered approx. half of the cornea. By 96 hours, the corneal injury had not changed substantially but the area of the eye covered had been drastically reduced. Severe conjunctival irritation was also observed between 4 and 96 hours at this concentration. (pH>14, 25%)
(d) Respiratory sensitization	Not available
(e) Skin Sensitization	Not classified
	Two weeks following the last induction application, the guinea pigs in the test group received a topical application of the test article to a dorsal, virgin site. At the same time, the control group animals received an identical dosage of the test article. Observations of irritation and other effects were recorded 7 and 24 hours after each induction application and 7, 24 and 48hours following the challenge application. This test article is not a sensitizer in guinea pigs, under the conditions of this test.
(f) Carcinogenicity	IARC, NTP, OSHA, ACGIH, EU Regulation 1272/2008: Not classified
(g) Mutagenicity	Not classified
	In vitro : Ames reversion test (<i>S. typhimurium</i>) with/ without metabolic activation: Negative In vitro : DNA repair test(<i>E. coli</i>) with/ without metabolic activation: Negative In vitro : Chromosome aberration test (<i>Chinese hamster ovary (CHO) K1 cells</i>) without metabolic activation: Negative, with metabolic activation: Positive, probably due to formation of clastogenic breakdown products of S9 In vivo : Micronucleus test (<i>Mouse bone-marrow cells</i>):Negative
(h) Reproductive toxicity	Not available
(i) Specific target organ toxicity (single exposure)	Not available
	The inhalation of aerosols of 5 % NaOH by a 25-year-old women resulted in irreversible obstructive lung injury after working for one day in a poorly ventilated room but difficult to apply to classification due to low reliability.
(j) Specific target organ toxicity (repeat exposure)	Not available
(k) Aspiration Hazard	Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity	Not classified
Acute toxicity	Fish: 96hr LC ₅₀ (<i>Gambusia affinis</i>)=125mg/L Crustacean: 48hr EC ₅₀ (<i>Ceriodaphnia sp.</i>)=40.4mg/L Algae: Not available

Chronic toxicity	Not classified
12.2 Persistence and degradability	Persistence: Not available Degradability: Not available
12.3 Bioaccumulative potential	Bioaccumulation: Not available Biodegradation: Not available
12.4 Mobility in soil	Not available
12.5 Results of PBT and vPvB assessment	NaOH does not fulfill the criteria for persistency, bioaccumulation and toxicity. Therefore NaOH is not considered a PBT or vPvB substance.
12.6 Hazardous to the ozone layer	Not classified
12.7 Other adverse effects	Not available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste.

13.1.1 Product/Packaging disposal:

List of proposed waste codes/waste designations in accordance with EWC.

Waste must be disposed of in line with local regulations. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.

For recycling, consult manufacturer

13.1.2 Waste treatment-relevant information:

Waste must be disposed of in accordance with directive 2008/98/EC.

13.1.3 Sewage disposal-relevant information:

Release to the environment or sewage system is prohibited. Must be treated as hazardous waste.

13.1.4 Other disposal recommendations:

Handle contaminated packages in the same way as the substance itself.

Solutions with high pH-value must be neutralized before discharge.

Neutralise with acid.

14. TRANSPORT INFORMATION

14.1 UN No. : 1824

14.2 UN Proper shipping name: SODIUM HYDROXIDE, SOLUTION

14.3 Transport Hazard class

ADR: 8

IMDG: 8

ICAO/IATA: 8

RID: 8

14.4 Packing group: II**14.5 Environmental hazards:** Not applicable**14.6 Special precautions for user****in case of fire:** F-A**in case of leakage:** S-B**15. REGULATORY INFORMATION****15.1 Safety, health and environmental regulation/legislation specific for the substance or mixture****Tactile warnings :** Danger**EU Regulatory Information****EU classification****EU 1272/2008(CLP)****Classification:** Skin Corr. 1A**Risk phrases:** H314**Safety phrases:** P280, P260, P264, P310, P363, P321, P405, P304+P340, P305+P351+P338,
P303+P361+P353**EU SVHC list:** Not regulated**EU Authorization list:** Not regulated**EU Restriction list:** Not regulated**Waste Framework Directive 2008/98/EC:** Hazardous waste**Foreign Inventory Status**

- Korea management information: Existing Chemical Substance : Phase-in substance subject to registration (KE-31487), Toxic Chemical(97-1-136)
- U.S.A management information: Section 8(b) Inventory (TSCA): Present
- Japan management information: Existing and New Chemical Substances (ENCS): ((1)-410, (2)-1972)
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (27689)
- Canada management information: Domestic Substances List (DSL): Present
- Australia management information: Australian Inventory of Chemical Substances (AICS): Present
- New Zealand management information: New Zealand Inventory of Chemicals (NZIoC): HSNO Approval: HSR001547
- Philippines management information: Philippine Inventory of Chemicals and Chemical Substances (PICCS): present

15.2 Chemical safety assessment :

For this substance a chemical safety assessment has been carried out.

16. OTHER INFORMATION

Product safety data sheet for prepared in accordance with Regulation (EU) 1272/2008

16.1 Indication of changes:

Preparation date: June 20, 2016

Version: 4

Revision date: July 15, 2020

16.2 Key literature reference and sources for data:National Chemicals Information System; <http://ncis.nier.go.kr/ncis/>Pubchem: <http://pubchem.ncbi.nlm.nih.gov/>AKRON: <http://ull.chemistry.uakron.edu/erd/>IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>

NIOSH (The National Institute for Occupational Safety and Health)
 ACGIH (American Conference of Governmental Industrial Hygienists)
 TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp>
 TSCA; http://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/searchbylist/search.do
 IECSC; <http://cciss.cirs-group.com/>
 ECHA; <http://echa.europa.eu/web/guest>
 HSDB; <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:@term+@na+HYDROGEN%20CHLORIDE>
 OECD SIDS; http://webnet.oecd.org/Hpv/UI/SIDS_Details.aspx?id=6E6AED5E-C43C-4930-A5FD-F3B4F5F558FF
 EU Regulation 1272/2008
 UN Recommendations on the transport of dangerous goods 17th
 National Emergency Management Agency-Korea dangerous material inventory management system;
<http://www.nema.go.kr/hazmat/main/main.jsp>

16.3 Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 (CLP):

Classification according to Regulation (EC) 1272/2008 (CLP)	Classification procedure
Skin Corr. 1A Eye Dam. 1	Cut-off values/concentration limits (Base with pH \geq 11,5)

16.4 Abbreviations

EC₅₀: median effective concentration
 LC₅₀: median lethal concentration
 LD₅₀: median lethal dose
 OEL: Occupational exposure limit
 PBT: Persistent, bioaccumulative, toxic chemical
 STEL: short-term exposure limit
 TWA: time weighted average
 vPvB: very persistent, very bioaccumulative chemical

16.5 Other

- Product should be handled, stored, and used in accordance with the generally accepted industrial hygiene practices and in conformity with all the applicable legal regulations.
- The information provided herein is based on the knowledge possessed at this present time from the view point of safety requirements.
- It should, therefore, not be construed as guaranteeing specific properties.