

SAFETY DATA SHEET

Date Printed : January 7, 2020

Version : 5th

Regulation : According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

1. Identification

1.1 Product identifier

1.1.1 Product name: Caustic soda (50%)

1.1.2 Other means of identification:

1.2 Recommended use of the chemical and restrictions on use

1.2.1 Recommended use: Raw material for metal and detergent, neutralizing agent

1.2.2. 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

1.3.1 Manufacturer

Company name: Hanwha Solutions Co, Ltd.

Address: Yeosu plant, Hanwha Solutions Co, Ltd., 117, Yeosusandan 3-ro, Yeosu-si, Jeollanam-do, Korea

Prepared by: CA Production 1, 2 Team

Contact Telephone (Yeosu plant) +82-61-688-1774

1.3.2 Supplier & Distributor

Company name: Hanwha Solutions Co, Ltd.

Address: 21F, Hanwha Bldg., Janggyo-dong, Jung-gu, Seoul, Korea

Prepared by: CA Domestic Sales Team

Contact Telephone: +82-2-729-3108

1.4 Emergency phone number

Emergency phone: +82-2-729-3108

2. Hazard(s) identification

2.1 Classification of the substance or mixture

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Physical / Chemical Hazards:

Not classified

Health Hazards:

Skin corrosion/irritation: Category 1

Serious eye damage /eye irritation: Category 1

Environmental Hazards:

Not classified

2.2 Label elements, including precautionary statements

o Pictogram and symbol:



o **Signal word:** Danger

o **Hazard statements:**

H314 Causes severe skin burns and eye damage.

H318 Causes serious eye damage.

o **Precautionary statements:**

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

P264 Wash your hands thoroughly after handling.

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

o **Treatment statements:**

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 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 (Reference to supplemental).

P363 Wash contaminated clothing before reuse.

o **Storage statements:**

P405 Store locked up.

o **Waste statements:**

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

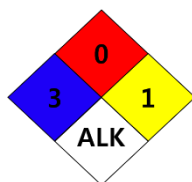
2.3 Other hazard information not included in hazard classification (NFPA)

o **Health:** 3

o **Flammability:** 0

o **Reactivity:** 1

o **Specific hazard:** ALK



3. Composition/information on ingredients

Component	Common name and synonyms	CAS No.	Conc. / %
Sodium Hydroxide	Caustic soda	1310-73-2	49.5 ~ 50.7
Water	Dihydrogen oxide	7732-18-5	49.3 ~ 50.5

4. First aid measures

4.1 Description of first aid measures

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 center immediately.

Skin contact

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

Inhalation

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

Ingestion

- Call a physician or poison control center 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.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms and effects: 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 Specific hazards arising from the chemical

- 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 may produce flammable hydrogen gas upon contact with metals.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.
- Some are oxidizers and may ignite combustibles.
- TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death.
- Contact with molten substance may cause severe burns to skin and eyes.

5.3 Special protective equipment and precautions for fire-fighters

- 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

- Atmosphere: Not available
- Land: Not available
- Underwater: Prevent entry into waterways, sewers, basements of confined areas.
Runoff from fire control may be corrosive and/or toxic and cause pollution.

6.3 Methods and materials for containment and cleaning up

- 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 your hands 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 breathing vapors from heated material.
- Avoid prolonged or repeated contact with skin.
- 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 only in original container.
- 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

Occupational Exposure limits

- o **ACGIH:** Ceiling=2mg/m³
- o **Biological exposure index:** Not available
- o **OSH:** TWA=2mg/m³, Ceiling=2mg/m³
- o **NIOSH:** Ceiling=2mg/m³
- o **EU regulation:**
 - Austria: TWA=2mg/m³
 - Bulgaria: TWA=2mg/m³
 - Czech Republic: Ceiling=2mg/m³
- o **Other:**
 - Mexico: Ceiling=2mg/m³
 - Philippine: TWA= 2mg/m³
 - Singapore: STEL=2mg/m³

8.2 Exposure controls

Appropriate engineering controls

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

Individual protection measures, such as personal protective equipment

Respiratory protection

- Wear NIOSH or approved full or half face piece (with goggles) respiratory protective equipment when necessary.

Eye protection

- Wear breathable safety goggles to protect from particulate 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 :	Colorless
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 applicable
Vapor pressure :	1 mmHg(739 °C)
Vapor density :	Not available
Solubility :	52%(20 °C), 42%(0 °C)
Solubility in organic solvents :	Not available
Partition coefficient: n-octanol/water :	LogKow=-3.88
Auto ignition temperature :	Not auto-ignitable
Decomposition temperature :	Not available
Viscosity :	4.0cP(350 °C)

“NOTE: The physical data presented above are typical values and should not be construed as a specification”

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, Allyl chloride, Allyl alcohol+benzenesulfonic chlroride, Aluminum, Ammonia + Silver nitrate, Ammonium salt, Benzene-1,4-diol, Bromine, Chloride trifluoride, Chloroform, Chlorohydrin, Chloride sulfate, Copper, Metal, Zinc, In aqueous solution, evolves hydrogen with metals. etc.

10.4 Hazardous decomposition products:

- Oxide of nitrogen

11. Toxicological information

Information on toxicological effects	
(a) Acute toxicity	Not classified
Oral	Rat, LD ₅₀ =140~340 mg/kg (Difficult to apply to classification due to the 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 1
	Occlusive 2 hours 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.
(c) Serious Eye Damage/ Irritation	Category 1
	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.
(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 CLP 1272/2008, US EPA: Not listed
(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 available
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 Hazardous to the ozone layer	Not classified
12.6 Other adverse effects	Not available

13. Disposal considerations

13.1 Disposal method

Waste must be disposed of in accordance with federal, state and local environmental control regulations. Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

13.2 Disposal precaution

Consider the required attentions in accordance with waste treatment management regulation.

14. Transport information

14.1 UN No.: 1824

14.2 UN Proper shipping name: SODIUM HYDROXIDE, SOLUTION

14.3 Transport Hazard class

ADR: UN1824, Sodium Hydroxide solution, 8, PG II

IMDG: UN1824, Sodium Hydroxide solution, 8, PG II

ICAO/IATA: UN1824, Sodium Hydroxide solution, 8, PG II

RID: UN1824, Sodium Hydroxide solution, 8, PG II

14.4 Packing group: II

14.5 Environmental hazards:

Marine pollutant: No

14.6 Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not established

14.7 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 USA
Regulatory Information

TSCA (Toxic Substances Control Act): Section 8(b) inventory (Present)

Proposition 65: Not regulated

OSHA Regulation: Not regulated

CERCLA Regulation: 453.599 kg 1000 lb

SARA 311/312 Hazard classes: Immediate (acute) health hazard

SARA 302 Regulation: Not regulated

SARA 304 Regulation: Not regulated

SARA 313 Regulation: Not regulated

Foreign Regulatory Information

Substance of Rotterdam Protocol: Not regulated

Substance of Stockholm Protocol: Not regulated

Substance of Montreal Protocol: Not regulated

Foreign Inventory Status

- Korea management information: Existing Chemical Substance (KE-31487),
Phase-in substance subject to registration (239),
Toxic Chemical (97-1-136)
- Japan management information: Existing and New Chemical Substances (ENCS): (1)-410, (2)-1972
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (27689)
- Australia management information: Australian Inventory of Chemical Substances (AICS): Present
- Canada management information: Domestic Substances List (DSL): 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

16. OTHER INFORMATION

16.1 Indication of changes:

Preparation date: June 20, 2016

Version: 5

Revision date: January 7, 2020

16.2 Key literature reference and sources for data:

- National chemicals information systems; <http://ncis.nier.go.kr>
- 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>
- ECHA; <http://echa.europa.eu/web/guest>
- HSDB; <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/>
- OECD SIDS; http://webnet.oecd.org/HPv/UI/SIDS_Details.aspx?id=6E6AED5E-C43C-4930-A5FD-F3B4F5F558FF
- NIOSH(The National Institute for Occupational Safety and Health)
- ACGIH(American Conference of Governmental Industrial Hygienists)
- TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp>
- Cameo chemicals; <https://cameochemicals.noaa.gov/chemical/3598>
- National Emergency Management Agency-Korea dangerous material inventory management system;
<http://www.nema.go.kr/hazmat/main/main.jsp>
- Waste Control Act enforcement regulation attached [1]

16.3 Abbreviations

ACGIH: American Conference of Governmental Industrial hygienists

NIOSH: The National Institute for Occupational Safety and Health

OSHA: Occupational Safety & Health Administration

IARC: International Agency for Research on Cancer

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

IMDG: International Maritime Dangerous Goods

ICAO/IATA: International Civil Aviation Organization/ International Air Transport Association

RID: Regulations Concerning the International Transport of Dangerous Goods by Rail

16.4 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.