

## Safety Data Sheet(SDS)

### 1. Identification of the substance/mixture and of the company/undertaking

1) Product identifier : SODIUM HYPOCHLORITE(NAOCL)

2) Relevant identified uses of the substance or mixture and uses advised against

○ Relevant identified uses

48.Others (Paper pulp, textile bleaching, bleaching agent, Laundry bleaching agent, etc)

○ Uses advised against

3) Supplier information

○ Company name [Manufacture]

Company : LG Chem, Ltd.

Address : 1121, Yeosusandan-ro, Yeosu-si, Jeollanam-do, Republic of Korea , 535, Sandanjungang-ro, Yeosu-si, Jeollanam-do, Republic of Korea

Emergency number : 82-061-680-6437

### 2. HAZARD IDENTIFICATION

1) Hazard classification

- Corrosive to metals Category 1
- Skin corrosion/irritation Category 1
- Serious eye damage/eye irritation Category 1
- Specific target organ toxicity single exposure Category 3(Respiratory tract irritation)
- Hazardous to the aquatic environment, short-term (acute) Acute 1
- Hazardous to the aquatic environment, long-term (chronic) Chronic 1

2) Allocation label elements

Hazard pictograms



Signal word

- DANGER

#### Hazard statements

H290 May be corrosive to metals  
H314 Causes severe skin burns and eye damage  
H318 Causes serious eye damage  
H335 May cause respiratory irritation  
H400 Very toxic to aquatic life  
H410 Very toxic to aquatic life with long lasting effects

#### Precautionary statements

- Prevention

P234 Keep only in original packaging.  
P260 Do not breathe mist/vapours/spray.  
P261 Avoid breathing mist/vapours/spray.  
P264 Wash skin thoroughly after handling.  
P271 Use only outdoors or in a wellventilated area.  
P273 Avoid release to the environment.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.

- Response

P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomition.  
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].  
P304+P340 IF INHALED: Remove person to fresh air and keep 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 receive medical institutions and doctors' consultation.  
P312 If you feel uncomfortable, receive medical institutions and doctors' consultation.  
P321 When contacting with substances, make a treatment such as rinsing the skin and eyes in the water flowing more than 20 minutes.  
P363 Wash contaminated clothing before reuse.  
P390 Absorb spillage to prevent materialdamage.  
P391 Collect spillage.

- Storage

P403+P233 Store in a wellventilated place. Keep container tightly closed.  
P405 Store locked up.  
P406 Since it is a metal corrosive substance, keep it in the manufacturer or the administrative government office in the corrosion resistant container.

- Disposal

P501 Dispose of contents and containers according to the legislation of the waste

### 3) Other hazards

○ Product NFPA Level

Health	Flamm ability	Reactivity
3	0	0

( ※ 0 = Insufficient , 1 = Slightly , 2 = ordinary , 3 = Highness , 4 = Very high)

### 3. Composition/Information on ingredients

Components	Common name	CAS No.	PCT(wt%)
Sodium hypochlorite	Sodium hypochlorite	7681-52-9	12
Sodium hydroxide	Sodium hydroxide	1310-73-2	2
Water	Water	7732-18-5	86

### 4. FIRST AID MEASURES

#### 1) Following eye contact

- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Seek immediate medial assistance.

#### 2) Following skin contact

- For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Remove and isolate contaminated clothing and shoes.
- Seek immediate medial assistance.

#### 3) Following inhalation

- Administer oxygen if breathing is difficult.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Give artificial respiration if victim is not breathing.
- If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.
- Keep victim warm and quiet.
- Move to fresh air.
- Seek immediate medial assistance.

#### 4) Following ingestion

- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Seek immediate medial assistance.

5) Advice to physician

- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

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## 5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media
  - CO<sub>2</sub>.
  - Dry chemical.
  - Regular foam.
  - Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
  - Use dry sand or earth to smother fire.
  - Water spray.
- Unsuitable extinguishing media
  - Direct water.
  - High-pressure water.

2) Special hazards arising from the substance or mixture

- Pyrolytic product
  - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
  - Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Risk of fire and explosion
  - Containers may explode when heated.
  - Some are oxidizers and may ignite combustibles.
  - Some may burn but none ignite readily.
  - When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Other
  - Contact with molten substance may cause severe burns to skin and eyes.
  - Fire may produce irritating, corrosive and/or toxic gases.
  - Some may produce flammable hydrogen gas upon contact with metals.
  - TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death.

3) Special protective equipment for firefighters

- Dike fire-control water for later disposal; do not scatter the material.
- Evacuate area and fight fire from a safe distance.

- Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
- Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks: 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: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
  
- Move containers from fire area if you can do it without risk.
- Rescuers should put on appropriate protective gear.
- Substance may be transported hot.
- Substance may be transported in a molten form.

## 6. ACCIDENTAL RELEASE MEASURES

### 1) Health considerations and protective equipment

- Clean up spills immediately, observing precautions in Protective Equipment section.
- Cover with plastic sheet to prevent spreading.
- Do not get water inside containers.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Do not touch or walk through spilled material.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Please note that materials and conditions to be avoided.
- Prevent dust cloud.
- Stop leak if you can do it without risk.

### 2) Environmental precautions

- Keep out of waterways.
- Prevent entry into waterways, sewers, basements or confined areas.
- Runoff may be corrosive and/or toxic and cause pollution.

### 3) For cleaning up

- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Absorb spill 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.
- Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.
- Large Spill: Dike far ahead of liquid spill for later disposal.
- Small Spill: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
  
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

## 7. HANDLING AND STORAGE

### 1) Precautions for safe handling

- Avoid breathing vapors from heated material.
- Avoid prolonged or repeated contact with skin.
- CAUTION: High temperature.
- Do not enter storage area unless adequately ventilated.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
  
- Handling refer to engineering control/personal protection section.
- Loosen closure cautiously before opening.
- Please note that materials and conditions to be avoided.
- Use care in handling/storage.
- Use only in a well-ventilated area.

### 2) Conditions for safe storage (including any incompatibilities)

- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.

## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

### 1) Chemical exposure limits, Biological exposure standard

Components	Occupational exposure limits	ACGIH	Biological standard
Sodium hypochlorite	TWA : Not applicable STEL : Not applicable	TWA : Not applicable STEL : Not applicable	Not applicable
Sodium hydroxide	TWA : Not applicable STEL : C 2mg/m <sup>3</sup>	TWA : Not applicable STEL : Not applicable	Not applicable
Water	TWA : Not applicable STEL : Not applicable	TWA : Not applicable STEL : Not applicable	Not applicable

### 2) Appropriate engineering controls

- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

### 3) Personal protection equipment

- Respiratory protection
  - If high frequency of use or exposure, wear air respirator.
  - Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.
- Eye protection
  - Wear suitable protective goggles and face shields.
- Hand protection
  - Wear suitable protective gloves.

- Body protection
  - Wear suitable protective clothing.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquid / Yellow
Physical state	Liquid
Colour	Yellow
Odour	A peculiar odor
Odour threshold	No data
pH	11
Melting point/freezing point	-20°C
Initial boiling point and boiling range	98°C
Flash point	No data available
Evaporation rate	No data
Flammability(solid, gas)	No data
Upper/lower flammability or explosive limits	No data
Vapour pressure	17.4~20hPa (20 °C)
Solubility(ies)	29.3 g/100g (0 °C)
Vapour density	0.7 (water)
Relative density	1.21
n-octanol/water partition coefficient	No data
Auto ignition temperature	No data
Decomposition temperature	No data
Viscosity	No data available
Molecular weight(mass)	74.4

## 10. STABILITY AND REACTIVITY

- 1) Stability and hazardous reactivity
  - Contact with molten substance may cause severe burns to skin and eyes.
  - Containers may explode when heated.
  - Fire may produce irritating and/or toxic gases.
  - Fire may produce irritating, corrosive and/or toxic gases.

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Some are oxidizers and may ignite combustibles.
- Some may burn but none ignite readily.
- Some may produce flammable hydrogen gas upon contact with metals.
- TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.

## 2) Conditions to avoid

- Heat, contamination.
- Heat.
- Ignition source(heat, spark, flame, etc.).

## 3) Incompatible materials

- Combustibles, reducing material.
- Metal.

## 4) Hazardous decomposition products

- Corrosive/toxic fume.
- During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
- Irritating and/or toxic gas.
- Irritating, corrosive and/or toxic gas.

# 11. TOXICOLOGICAL INFORMATION

## 1) Exposure route information

- Inhalation
  - May cause respiratory irritation
- Skin Contact
  - Causes severe skin burns and eye damage
- Eye Contact
  - Causes serious eye damage
- Ingestion
  - Not applicable

## 2) Health hazard information

- Acute toxicity
  - Acute toxicity(Oral) PRODUCT : Not classified(ATEmix = 10266.667mg/kg)
    - Sodium hypochlorite : LD50 8800 mg / kg Experimental Arts: RAT (CHLORINE - BLEACHING SOLUTION (12.5% Active Chlorine)), Source: ECHA
    - Sodium hydroxide : LD50 325 mg / kg Experimental: Rabbit (Reliability 4, not sufficient for hazard classification), Source: ECHA
    - Water : No data available

- Acute toxicity(Dermal) PRODUCT : Not classified(ATEmix = 1100mg/kg)
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : LD50 1350 mg / kg Experimental Arts: RABBIT, Source: NCIS
  - Water : No data available
- Acute toxicity(Inhalation:Gases) PRODUCT : Not classified
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : No data available
  - Water : No data available
- Acute toxicity(Inhalation:Vapours) PRODUCT : Not classified
  - Sodium hypochlorite : LC50> 10.5 mg / ℓ experimental species: Rat
  - Sodium hydroxide : No data available
  - Water : No data available
- Acute toxicity(Inhalation:Dust/mist) PRODUCT : Not classified
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : No data available
  - Water : No data available
- Skin corrosion/irritation PRODUCT : Category 1
  - Sodium hypochlorite : This material exhibits a skin corrosive to humans., Source: International Uniform Chemical Information Database(IUCLID)(<http://ecb.jrc.it/esis>)
  - Sodium hydroxide : Search using rabbit skin corrosion / irritation test results irritation Causes severe corrosion observed in the OECD Guideline 404 people. It causes severe skin necrosis in rabbits. Strong alkaline corrosive substances, Source: ECHA
  - Water : No data available
- Serious eye damage/eye irritation PRODUCT : Category 1
  - Sodium hypochlorite : This material represents a pole and corrosive to a human., Source: International Uniform Chemical Information Database(IUCLID)(<http://ecb.jrc.it/esis>)
  - Sodium hydroxide : Severe eye damage / irritation test results using rabbits Serious conjunctival stimulation is observed OECD GUIDELINE 405 KOREA MINISTRY OF EMPLOYMENT AND LABOR Classification, display and material safety Data on the Safety Data Data <State 1> Classification of division 1, Source: ECHA
  - Water : No data available
- Respiratory sensitization PRODUCT : Not classified
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : No data available
  - Water : No data available
- Skin sensitization PRODUCT : Not classified
  - Sodium hypochlorite : It does not cause hypersensitivity reactions in human skin., Source: International Uniform Chemical Information Database(IUCLID)(<http://ecb.jrc.it/esis>)

- Sodium hydroxide : This did not show skin sensitization in skin sensitization tests on humans negative, Source: SIDS
- Water : No data available
- Carcinogenicity PRODUCT : Not classified
  - Sodium hypochlorite : Group 3 (Hypochlorite Salts) (IARC), Source: IARC
  - Sodium hydroxide : No data available
  - Water : No data available
- Germ cell mutagenicity PRODUCT : Not classified
  - Sodium hypochlorite : Mouse bone marrow cell chromosome abnormality test, aneuploidy testing (IARC (1991)) voice; Mouse bone marrow micronucleus test multiple cells (IARC (1991), IUCLID (2000)) voice; Rat micronucleus test speech (IUCLID (2000)); Mouse bone marrow cells micronucleus test negative in the positive and negative (National Institute for Occupational Safety and Health GLP Toxicity Test, 2012) added to the in vitro mutagenicity test of ames test, chromosome aberration test (IARC (1991), IUCLID (2000) ), Source: IARC (1991), 산업안전보건연구원 독성 GLP 시험, 2012, IUCLID(2000)
  - Sodium hydroxide : Return using in vitro bacterial mutation tests, using the Ames regardless voice, in vitro S. typhimurium in the presence or absence of metabolic activation system test results, regardless of the presence or absence of metabolic activation system audio, test or more chromosomes using CHO cells in vitro results, If that metabolic activation system positive / no metabolic activation system visible due to induced or more of the audio S9 product chromosome formation, minute cell test results using in vivo mouse bone marrow cells, negative, Source: ECHA
  - Water : No data available
- Reproductive toxicity PRODUCT : Not classified
  - Sodium hypochlorite : No harmful effects on reproduction, Source: International Uniform Chemical Information Database(IUCLID)(<http://ecb.jrc.it/esis>)
  - Sodium hydroxide : No data available
  - Water : No data available
- Specific target organ toxicity single exposure PRODUCT : Category 3(Respiratory tract irritation)
  - Sodium hypochlorite : Causes irritation to the respiratory system, Source: International Chemical Safety Cards (ICSC)(<http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/index.htm>)
  - Sodium hydroxide : Rooms at stimulating the respiratory, airway in humans and does not sufficiently ventilated place causing a pulmonary edema during the working day, and although the rain was observed irreversible obstructive damage in a 25-year-old women who inhaled aerosol form into the lungs of 5 % NaOH insufficient evidence, Source: NLM, SIDS
  - Water : No data available
- Specific target organ toxicity repeated exposure PRODUCT : Not classified
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : No data available
  - Water : No data available

- Aspiration hazard PRODUCT : Not classified
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : No data available
  - Water : No data available

## 12. ECOLOGICAL INFORMATION

### 1) Aquatic toxicity

- Fish>PRODUCT : Acute 1
  - Sodium hypochlorite : LC50 0.033 ~ 0.097 mg / ℓ 96 Hr Clupea Harengus, Source: International Uniform Chemical Information Database(IUCSID)(<http://ecb.jrc.it/esis>)
  - Sodium hydroxide : LC50 125 mg / ℓ 96 hr Other (Gambusia affinis)
  - Water : No data available
- Crustacea>PRODUCT : Acute 1
  - Sodium hypochlorite : LC50 0.032 mg / ℓ 48 hr, Source: ECOTOX
  - Sodium hydroxide : EC50 40.4 mg / ℓ 48 hr Other (Ceriodaphnia dubia), Source: ECHA
  - Water : No data available
- Aquatic algae>PRODUCT : Acute 1
  - Sodium hypochlorite : EC50 0.075 mg / ℓ 24 hr, Source: ECOTOX
  - Sodium hydroxide : No data available
  - Water : No data available

### 2) Persistence and degradation

- n-octanol water partition coefficient>PRODUCT : Chronic 1
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : -3.88 log Kow (estimated), Source: SRC
  - Water : No data available
- Degradation>PRODUCT : Chronic 1
  - Sodium hypochlorite : (Not rapid degradability is because it is judged minerals)
  - Sodium hydroxide : No data available
  - Water : No data available
- Biodegradation>PRODUCT : Chronic 1
  - Sodium hypochlorite : No data available
  - Sodium hydroxide : (Not applicable (Source: Not applicable)), Source: OECD SIDS
  - Water : No data available

### 3) Bioaccumulative potential>PRODUCT : Chronic 1

- Sodium hypochlorite : 3.162, Source: Quantitative Structure Activity Relation(QSAR)
- Sodium hydroxide : (I expect that this will not bioaccumulate in high water solubility (Source: Considering its high water solubility, NaOH is not expected to bioconcentrate in organisms)), Source: OECD SIDS
- Water : No data available

4) Mobility in soil>PRODUCT : Chronic 1

- Sodium hypochlorite : No data available
- Sodium hydroxide : (Im very flexible (Originally in water and soil: Very mobile in soil and very soluble in water).),  
Source: OECD SIDS
- Water : No data available

5) Other adverse effects>PRODUCT : Chronic 1

- Sodium hypochlorite : No data available
- Sodium hydroxide : No data available
- Water : No data available

### 13. DISPOSAL CONSIDERATIONS

1) Disposal methods

- Every commercial waste producer shall either treat wastes generated from his/her place of business by him/herself or commission the treatment of such wastes to a person who has license for a waste treatment business under Article 26(3), a person who recycles of such wastes under Article 44(2), a person who has installed and operates a waste disposal facility under Article 4 or 5, a person who has completed the registration of a business of discharging wastes into the sea under Article 18 of the Marine Environment Management Act.

2) Precautions (including disposal of contaminated container of package)

- Do not allow spill material to enter sewers, storm water drains, soil, etc.

### 14. TRANSPORT INFORMATION

1) UN No. : 1760

2) Proper shipping name : CORROSIVE LIQUID, N.O.S.

3) Class or division : 8

4) Packing group : I

5) Marine pollutant : Yes

6) Special safety response for transportation or transportation measure :

Emergency measures in case of fire : F-A

Emergency measures in the effluent : S-B

- ADR

· Tunnel restriction code : E

- IMDG

· Marine pollutant : Yes

- Air transport(IATA)

· UN No. : 1760

· Proper shipping name : CORROSIVE LIQUID, N.O.S.

- Class or division : 8
- Packing group : I

## 15. REGULATORY INFORMATION

### 1) Occupational Safety and Health Act in Korea

PRODUCT : Environment measure substance, Hazardous Substances Requiring Management, Substance exposure limits

- Sodium hydroxide : Environment measure substance (more than 1% ), Hazardous Substances Requiring Management (more than 1% ), Substance exposure limits

### 2) Toxic Chemical Control Act in Korea

PRODUCT : Pollutant release and transfer register substances

- Sodium hydroxide : Pollutant release and transfer register substances, Toxic substances (more than 5% )

### 3) Safety Control of Dangerous Substances Act in Korea

PRODUCT : Not applicable

### 4) Wastes Control Act in Korea

PRODUCT : Designated waste

- In case of disposal, it must be disposed of in accordance with Article 13 of the Waste Management Act.

### 5) Other regulations in KOREA and Abroad regulations

- ETC regulation

- Sodium hypochlorite : EU. GHS Classification. CLP Reg. No 1272/2008 of 16 Dec 2008, Annex VI, Table 3.1, List of harmonized classification & labelling
- Sodium hydroxide : EU. GHS Classification. CLP Reg. No 1272/2008 of 16 Dec 2008, Annex VI, Table 3.1, List of harmonized classification & labelling
- Sodium hypochlorite : CERCLA Hazardous Substances [other than radionuclides] (40 CFR 302.4) (as amended by 75 FR 78918, Dec. 17, 2010)
- Sodium hydroxide : CERCLA Hazardous Substances [other than radionuclides] (40 CFR 302.4) (as amended by 75 FR 78918, Dec. 17, 2010), OSHA Hazard Communication Standard: On One of the Floor Lists of the OSHA HCS (29 CFR 1910.1200)
- PERSISTENT ORGANIC POLLUTANTS CONTROL ACT
- Act on the registration and evaluation of chemicals PRODUCT : Existing Commercial Chemical Substances, Existing chemicals subject to registration
  - Sodium hypochlorite : Existing Commercial Chemical Substances, Existing chemicals subject to registration
  - Sodium hydroxide : Existing Commercial Chemical Substances, Existing chemicals subject to registration

## 16. OTHER INFORMATION

### 1) Reference

- ECHA
- ECOTOX
- IARC (1991), 산업안전보건연구원 독성 GLP 시험, 2012, IUCLID(2000)
- International Chemical Safety Cards (ICSC)(<http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht/index.htm>)
- International Uniform Chemical Information Database(IUCLID)(<http://ecb.jrc.it/esis>)

- Ministry of Employment and Labor
- Ministry of Environment
- NCIS
- NLM, SIDS
- OECD SIDS
- Quantitative Structure Activity Relation(QSAR)
- SIDS
- SRC

2) Print date : 2022-09-19

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- Last revised history :

4) Other