SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME CAUSTIC SODA FLAKE
COMPANY PRODUCT CODE 01101
NAME OF THE SUPPLIER Tokuyama Corporation
ADDRESS FRONT PLACE AKIHABARA, 7-5, Sotokanda 1-chome Chiyoda-ku, Tokyo 101-8618, Japan
SECTION Chemicals East Japan Sales Department
TELEPHONE NUMBER 81-3-5207-2511
TELEFAX NUMBER 81-3-5207-2574
THE DATE OF ISSUE Mar. 15, 1993
REVISION DATE May. 1, 2016
RECOMMENDED USE OF THE CHEMICAL AND RESTRICTIONS ON USE Industrial use

2. HAZARD IDENTIFICATION

- CLASSIFICATION OF THE SUBSTANCE OR MIXTURE
  Corrosive to metals Category 1
  Acute toxicity-Oral Category 3
  Skin corrosion/irritation Category 1
  Eye Damage/irritation Category 1
  Specific target organ toxicity (Single exposure) Category 1< respiratory organ>
  Hazardous to the aquatic environment-Acute hazard Category 3
- GHS LABEL ELEMENTS
  Hazard symbol :

Signal word :Danger
Hazard statements :H290:May be corrosive to metals
H301:Toxic if swallowed
H314:Causes severe skin burns and eye damage
H318:Cause serious eye damage
H370:Causes damage to organs< respiratory organ >
H402:Harmful to aquatic life

Precautionary statement:
Prevention
P234:Keep only in original container.
P264:Wash hand thoroughly after handling.
P270:Do not eat, drink or smoke when using this product.
P260:Do not breathe dust.

P280：Wear protective gloves and eye/face protection.
P273：Avoid release to the environment.

Response

P390：Absorb spillage to prevent material damage.
P301+ P310, P330：IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.
P301+P330+ P331：IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303+P361+ P353, P363：I F ON SKIN: Rinse skin with water/shower.
Take off immediately all contaminated clothing and wash before reuse.
P304+ P340：IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310 Immediately call a POISON CENTER or doctor/physician.
P305+ P351+ P338：IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P311：IF exposed or concerned: Call a POISON CENTER or doctor/physician.

STORAGE

P406：Store in corrosive resistant/ container with a resistant inner liner.
P405：Store locked up.

DISPOSAL

P501：Dispose of contents/container in accordance with local/ regional/ national/ international regulation.

3. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/PREPARATION： Substance
COMMON CHEMICAL NAME OR THE GENERIC NAME： Sodium hydroxide
SYNONYMS： Caustic soda flake, caustic soda solid, flake caustic soda, solid caustic soda, sodium hydroxide flake, sodium hydroxide solid
CHEMICAL FORMULA： NaOH
CAS NUMBER.： 1310-73-2
OFFICIAL PUBLICATION NUMBER： (1)-410 (in Japan)
TSCA REGISTRY： 1310-73-2
EINECS NUMBER： 215-185-5
INGREDIENTS AND COMPOSITION： Greater than 98.5%

4. FIRST-AID MEASURES

INFORMATION

INHALATION

・Remove victim from exposure to chemical and provide fresh air immediately.
・If breathing is difficult, give artificial respiration after loosing clothing and securing airway.
・Keep victim warm with blanket.
・Get medical attention immediately.

SKIN CONTACT

・Remove contaminated clothing, shoes and socks immediately. Cut off clothing, if necessary.
・Flush with a large amount of water with soap or mild detergent for at least 15 minutes until no evidence of chemical remains.
・Get medical attention.

EYE CONTACT

・Immediately flush eyes with a large amount of water for at least 15 minutes while holding eyelids open until no evidence of chemical remains. A delay of only seconds may increase injury.
・Get medical attention immediately.

INGESTION

・Do not induce vomiting due to the corrosive nature of caustic soda.
・If vomiting occurs, keep victim's head lower than hips to prevent aspiration.
・Never give anything by mouth to unconscious person.
・If victim is conscious, wash victim's mouth with water, and give victim glasses of water or milk mixed with egg whites.
・Get medical attention immediately.
・NOTE TO PHYSICIAN: For ingestion, consider esophagoscopy. Avoid gastric lavage.

5. FIRE−FIGHTING MEASURES

・EXTINGUISHING: Negligible fire hazard.
・FIRE-EXTINGUISHING AGENTS: Use extinguishing agents appropriate for surrounding fire.
・Move containers from fire area if it can be done without risk.
・Caustic soda flake is hazardous if present in fire area due to its tendency to melt and flow at high temperature.
・Fire fighting water with dissolved caustic soda will have strong alkalinity and should be neutralized prior to disposal.

6. ACCIDENTAL RELEASE MEASURES

・Do not touch spilled material without protectives.
・Stop leak if you can do it without risk.
・Collect spilled material in appropriate container using broom and shovel.
・Keep unnecessary people away, isolate hazard area and deny entry.
・Flush any contaminated surfaces with water.
・Prevent spills from entering sewers, watercourses or low areas.
・Do not discharge waste caustic soda into sewers without prior neutralization.

7. HANDLING AND STORAGE

Handle and store in accordance with all current regulations and standards.
Caustic soda flake is an extremely corrosive, strongly alkaline and very hygroscopic material. You

should restrict caustic soda handling to those persons fully aware of its hazards and emergency procedures.
Emergency showers, eye wash facilities, sewers and rinsing equipment must be located in any area where you handle caustic soda.

●HANDLING:

・Wear safety goggles, respiratory mask, rubber gloves, rubber boots and full protective clothing.
・Avoid contact with eyes, skin and clothing.
・Consume material immediately to prevent adsorbing atmospheric humidity after opening containers.
・Keep containers tightly close to prevent humidity adsorption after opening containers.
・Prohibit unnecessary persons from entering handling area.
・Do not bring contaminated protectives such as gloves into the rest area.
・Avoid rough handling of containers such as overturning, dropping, and dragging.

●STORAGE:

・Avoid humid area.
・Store in cool and dark area.
・Store in locked area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

・CONTROLLED CONCENTRATION: Not applicable in Japan
・EXPOSURE LIMITS: 2mg/m^3 (ACGIH 2013, ceiling value)
・EQUIPMENT AND MACHINES:
Provide local exhaust ventilation system.
Ensure compliance with applicable exposure limits.
・PROTECTIVES: Wear safety goggles, filter respirator, rubber gloves, rubber boots, full protective clothing, supplied-air respirator, self-contained breathing apparatus, etc.

9. PHYSICAL AND CHEMICAL PROPERTIES

・APPEARANCE: White or off-white solid.
・CHANGE IN APPEARANCE: Hygroscopic
・PHYSICAL FORM: Flake, granules, powder
・MOLECULAR WEIGHT: 40.0
・BOILING POINT: 1390℃
・MELTING POINT: 318℃
・SPECIFIC GRAVITY: 2.13 (10℃)
・SOLUBILITY: Soluble in water
・HEAT OF SOLVATION in WATER: −1.06 kJ/g (exothermic)
・SOLUBILITY IN WATER: 42g/100g water at 0℃, 109g/100g water at 20℃
・pH OF 4% AQUEOUS SOLUTION: pH=14

10. STABILITY AND REACTIVITY

・REACTIVITY with WATER: Reacts with evolution of heat and may cause violent sputtering.
・REACTIVITY with ACIDS: Reacts violently.
・REACTIVITY with METALS: Corrodes and reacts with metals.
・REACTIVITY with CARBON DIOXIDE: Forms sodium carbonate.
・CONDITION TO AVOID: Heat, flames, sparks and other sources of ignition. Dangerous gases may accumulate in confined spaces.
・INCOMPATIBILITIES: Combustible materials, acids, halo carbons, metals, halogens, oxidizing materials, peroxides, metal salts.
・OXIDIZING QUALITY: None
・SELF-REACTIVITY AND EXPLOSIVES: None

11. TOXICOLOGICAL INFORMATION

Caustic soda can be destructive to human tissue causing severe damage or illness if contact is made to eyes, skin or respiratory tract.

●ACUTE TOXICITY:

・Oral Rabbit LD_{50}325mg/kg(Caustic soda solid)[4)]

Lethal dose becomes 80-167 mg/kg (Caustic soda solid) than a poisoning example in the human, if weight of the human in the case of 60 kg.

●SKIN CORROSION/IRRITATION: Species Concentration Result

Human	0.5%	Irritation[4)]
Pig	8%	Severe necrosis[4)]
Rabbit	5%	Severe necrosis[5)]

●EYE DAMAGE/IRRITATION: Species Concentration Result

Rabbit	1.2%	Corrosive[4)]

●SPECIFIC TARGET ORGAN TOXICITY(Single exposure): respiratory organ

●CHRONIC TOXICITY: Conjunctivities or effects similar to those for acute exposure may occur.

12. ECOLOGICAL INFORMATION

・BIOTOXICITY

Fish	Gambusia affinis	LC_{50}(96h) 125mg/L[4)]
	Crustacea Ceriodaphnia sp.	LC_{50}(48h) 40.4mg/L[4)]

For this article which was a water solution product, applied "Bridging Principles (GHS document 4.1.3.3)" and assumed it Not classified (20-40% solution) and category 3(41-50% solution).

13. DISPOSAL CONSIDERATIONS

・Dispose in accordance with all current regulations.

・SMALL DISPOSAL: Dilute with a large amount of water and neutralize with acids to about pH 7.
・LARGE DISPOSAL: Dispose using authorized waste collection plant, or obtain the consent of pollution control authorities.

14. TRANSPORT INFORMATION

INFORMATION ON CODES AND CLASSIFICATIONS ACCORDING TO INTERNATIONAL REGULATIONS

UN NUMBER: Isopropanol –UN1823
UN CLASS: 8 (Corrosive material, container grade:2)
PACKING GROUP : Ⅱ
MARITIME TRANSPORT IMDG: None

SPECIFIC PRECAUTIONARY TRANSPORT MEASURES AND CONDITIONS

・Transport in accordance with all current regulations.
・When carrying by vehicle, transportation information must be carried by driver.
・Make sure no leaking in containers.
・Load containers avoiding turning upside-down, dropping, damaging and collapsing.
・Avoid containers get wet due to rain.

15. REGULATORY INFORMATION

Regulatory information with regard to this substance in your country or in your region should be examined by your own responsibility.

16. OTHER INFORMATION

The information herein is given in good faith, but no warranty is made, either express or implied. To the best of our knowledge, the information contained herein is accurate. However, Tokuyama Corporation doesn't assume any liability whatsoever for the accuracy or completeness of information contained herein.
Final determination of suitability of any material should be made on the sole responsibility of the user. All materials may present unknown hazards and should be used in caution. Although certain hazards are described herein, we make no warranty that these are all hazards which exist.

17. REFERENCES

1) Registry of Toxic Effects of Chemical Substances (NIOSH, 2000)
2) Treatment Manual on Hazardous and Poisonous Chemicals (Institute of Overseas Technology, 1985).
3) Chemical Toxicity that May Affect Fish and Aquatics (Industrial Data Center, 1973).
4) Screening Information Data Set(2005)

5) PATTY's Toxicology 5th(2001)