

PRODUCT: SODIUM HYPOCHLORITE**Issue Date:** June 29nd, 2011**Revision date:** Apr 5th, 2013

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1 – Identification

GHS Product identifier: **SODIUM HYPOCHLORITE**

Recommended use of the chemical and restrictions on use: Industrial use.

Name: **BRASKEM S/A.**

Address: Rua Oxigênio, 765 - Polo Petroquímico
CEP: 42810-000
Camaçari/BA - Brasil

Phone number: (71) 3413 3344

Emergency phone number: (71) 3413 3399

Address: Av. Assis Chateaubriand, 5260 - Pontal da Barra
CEP: 57010-900
Maceió/AL - Brasil

Phone number: (82) 3177 5211

Emergency phone numbers: 08000 82 1660 or (82) 3326 6828

2 – Hazard identification

Classification of the substance (*)	Hazard Classes	Category
	Oxidizing liquids	1
	Skin corrosion	1B
	Serious eye damage	1
	Hazardous to the aquatic environment – acute hazard	1

GHS label elements, including precautionary statements ():****Pictograms:****Signal word:**

Danger

Hazard statements:

H271: May cause fire or explosion; strong oxidizer
H314: Causes severe skin burns and eye damage
H318: Causes serious eye damage
H400: Very toxic to aquatic life

Additional labelling requirements (CLP supplemental hazard statement)():**

EUH031: Contact with acids liberates toxic gas.

Precautionary statements:

Prevention:
P210: Keep away from heat.

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P220: Keep/Store away from clothing and other combustible materials.
P221: Take any precaution to avoid mixing with combustibles.
P260: Do not breathe dusts or mists.
P264: Wash hands thoroughly after handling.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P283: Wear fire/flame resistant/retardant clothing.

Response:

P310: Immediately call a POISON CENTER or doctor.
P363: Wash contaminated clothing before reuse.
P391: Collect spillage.
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 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.
P306 + P360: IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes.
P371 + P380 + P375: In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container should be in accordance with local regulations.

(*) GHS 2011 (Globally harmonized system of classification and labeling of chemicals 2011).

(**)**CLP: (*) (Regulation of European Commission (EC) N° N°1282/2008 on Classification, Labeling and Packaging of substances and mixtures. European Union, 2008.

Other hazards which do not result in classification:

The product may be corrosive to metals.

3 – Composition/information on ingredients**SUBSTANCE**

Common name of the substance:	Sodium hypochlorite.
Synonyms:	Sodium chloride oxide; hypochlorous acid, sodium salt.
CAS number:	7681-52-9
Impurities and stabilizing additives which are themselves classified and which contribute to the classification of the substance:	It is not available.

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4 – First-aid measures

Inhalation:	Take the victim to fresh air. Seek medical attention immediately and take the product container or label with you.
Skin contact:	Take off contaminated clothes and shoes. Wash exposed skin with plenty of water, avoiding the spread of the material to unaffected skin areas. Seek immediate medical attention and take the product container or label with you.
Eye contact:	First check the victim for contact lenses and remove them, if present. Wash exposed eyes with abundant water in room temperature for at least 15 minutes, lifting the eyelid while washing them. Seek medical attention and take the product container or label with you.
Ingestion:	DO NOT INDUCE VOMITING. Wash the mouth with plenty of water. In case of spontaneous vomiting, keep the head below the level of the hips. If the individual is lying down, keep him/her in lateral position to avoid aspiration of the gastric content. Seek immediate medical attention and take the product container or label with you.
Most important symptoms/effects, acute and delayed:	Corrosive product. If in contact with the eyes, the product may cause severe burns, pain, lacrimation and photophobia. If in contact with the skin, the product can cause severe burns. Inhalation of vapors from the product may cause severe irritation in the respiratory tract with coughing, headache, confusion, burns, breathing difficulty, pulmonary edema and, possibly, coma. Ingestion may cause corrosion of mucous membranes, esophagus, stomach, burning in the mouth and throat, nausea and vomiting. Aspiration may cause pulmonary complications.
Notes to an attending physician:	Symptomatic treatment. There is no specific antidote. Perform topical therapy in case of burns.

5 – Fire-fighting measures

Suitable extinguishing media:	Small fire: use dry chemical, carbon dioxide (CO ₂) or water spray. Large fire: dry chemical, carbon dioxide (CO ₂), alcohol-resistant foam or water spray. Do not get water inside containers. Move containers from fire area, if you can do it without risk. Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution. Dike fire-control water for later disposal; do not scatter the material.
Specific hazards arising from the chemical:	Contact with metals may release flammable hydrogen gas. Fire may produce irritating, corrosive and/or toxic gases of chlorine, sodium oxide and hydrogen chloride.
Special protective actions for fire-fighters:	Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Wear full protective clothing and self-contained breathing apparatus. Structural firefighters' protective clothing provides limited protection in fire situations only; it is not effective in spill situations where direct contact with the substance is possible. During the fire extinguishment, avoid contact with the substance; if it is not possible, wear chemical protective clothing.

6 – Accidental release measures**Personal precautions, protective equipment and emergency procedures:**

For non-emergency personnel:	Corrosive product. Use personal protective equipment (PPE). Avoid contact of the product with the skin, eyes and mucous membranes. Do not handle broken packaging unless wearing personal protective equipment. Do not touch or walk through spilled material. Stay upwind.
For emergency responders:	Use suitable PPE. Keep unauthorized personnel away.

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Environmental precautions:

In case of spilling or leaking, contain the spill immediately. Do not allow dispersed product to enter in sewers or watercourses. If product enters in the watercourses, immediately interrupt the human or animal use and contact local environmental agency or the company emergency center, since the measures to be taken depend on a variety of factors such as the accident proportion, the watercourse characteristics and the amount of spilled product.

Methods and materials for containment and cleaning up:

Use PPE. Isolate contaminated area and signalize it. Do not get water inside containers. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak, if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas.

Paved areas: absorb or cover with dry earth, sand or other non-combustible material. Collect the spilled material with a shovel and place it in a marked, tightly closed containers for later disposal. Wash the area with water, taking preventive measures to avoid environmental contamination by wastewater. Spilled product can not be used further and must be disposed of. Contact the manufacturer for return and disposal.

Soil: Remove contaminated soil until achieving uncontaminated soil and conduct in accordance with the information above.

7 – Handling and storage**Precautions for safe handling:**

Corrosive product. Use corrosion resistant PPE. Do not handle product without the recommended PPE or if they are damaged. Avoid the contact of the product with skin, eyes and mucous membranes. Handle the product in an open and ventilated area. Ensure good ventilation in the work area. When opening the package, do it avoiding splash. Before opening and handling this product, read carefully the instructions of use printed on the label. Observe the expiration date. Do not reuse the empty package. Do not wash package in lakes, rivers and watercourses. Do not eat, drink or smoke while handling the product.

Conditions for safe storage, including any incompatibilities:

Store the product in the original package, tightly closed, at room temperature, protected from sunlight. Store away from food, animal feed, beverages and incompatible materials. Lock the place, preventing the access of unauthorized people, mainly children. There must always be adequate packing available to cover and protect broken or cracked packages or to collect leaked products. Observe the disposals of the state and local legislation.

Recommended packaging material: tanks or drums made of polyvinyl chloride (PVC), high density polyethylene (HDPE), polypropylene (PP), polytetrafluoroethylene (PTFE), epoxy vinyl ester resins, phenolic and furan resins, polyester, natural rubber, neoprene and viton.

8 – Exposure controls/personal protection**Control parameters****Occupational exposure limit values:**

There are no occupational exposure limit values established by ACGIH (2012), OSHA or NIOSH.

Biological exposure indices:

There are no biological exposure indices established by ACGIH (2012).

Appropriate engineering controls:

Provide local ventilation at workplace. Provide exhaust ventilation where processes require. Provide emergency shower and eye washer near the workplace.

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Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection:	Wide vision safety goggles for chemical products.
Skin protection:	Aprons, protective clothes, PVC or rubber boots and impermeable gloves (butyl rubber, natural rubber, neoprene, nitrile rubber, PE, PVC or Viton).
Respiratory protection:	Semifacial mask with filter against gases, and air-supplied respirator for emergency situations.
Thermal hazards:	It is not available.

9 – Physical and chemical properties

Appearance:	Liquid, yellow.
Odour:	Unpleasant and sweetish odor (U.S. EPA, 2012).
Odour threshold:	It is not available.
pH:	11.5 – 12.5 (CETESB, 2011).
Melting point/freezing point:	It is not applicable, the product is liquid.
Initial boiling point and boiling range:	Decomposes above 104°F/40°C (ATSDR, 2011).
Flash point:	It is not flammable. There are no information available regarding the flash point (ECHA, 2007).
Evaporation Rate:	It is not available.
Flammability (solid, gas):	It is not applicable.
Upper/lower flammability or explosive limits:	It is not applicable.
Vapour pressure:	Sodium hypochlorite (12.5% solution): 1613.2 – 2333.1 Pa (12.1 – 17.5 mm Hg) at 68°F/20°C (U.S. EPA, 2012).
Vapour density:	It is not available.
Relative density:	1.19 at 12%.
Solubility:	Completely soluble in water (12.5% solution) (U.S. EPA, 2012).
Partition coefficient: n-octanol/water:	It is not available.
Auto-ignition temperature:	It is not available.
Decomposition temperature:	Above 104°F/40°C (MTU, 1998).
Viscosity:	1.81 at 77°F/25°C (12.5% solution) (U.S. EPA, 2012).
Corrosivity:	The hypochlorite solution is corrosive to metals (MTU, 1998).
Oxidation/ Reduction:	Strong oxidizing agent (U.S. EPA, 2012).

10 – Stability and reactivity

Reactivity:	Sodium hypochlorite reacts with nitrogenous compounds and can form toxic, reactive chloramines. When hypochlorite is present in excess, nitrogen gas is formed (MTU, 1998). Sodium hypochlorite is a strong oxidizing agent. (U.S. EPA, 2012).
Chemical stability:	It is unstable. Sodium hypochlorite solutions are inherently unstable. Stability is affected by heat, light, pH, and the presence of certain heavy metals such as iron and copper (U.S. EPA, 2012).
Possibility of hazardous reactions:	Sodium hypochlorite reacts violently with oxidizing agents and it may result in fire. In contact with ammonium salts, sodium hypochlorite may form explosive nitrogen trichloride, if acid present. Sodium hypochlorite reacts with acids (mainly hydrochloric acid) releasing chlorine gas. Sodium hypochlorite can react with methanol to form methyl hypochlorite, which can explode (MTU, 1998).

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Conditions to avoid:

Sources of ignition, heat and contact with incompatible substances.

Incompatible materials:

Acids, ammonium salts, methanol, urea, amines, isocyanurate, oxidizing compounds, metals and oxidizable metals compounds, aziridine, alkalis, ketones, fatty acid salts, bisulfates, phenylacetonitrile, cellulose, nitrogen compounds, polymerizable compounds, explosives, isocyanates and epoxies.

Hazardous decomposition products:

At temperatures above 104°F (40°C), the solution of sodium hypochlorite decomposes slowly in sodium chloride and sodium chlorate.

11 – Toxicological information**Acute toxicity:**12.5% sodium hypochlorite solution:
LD₅₀ oral (rats): 8800 mg/kg b.w. (ECHA, 2007).**Skin corrosion/irritation:**

Studies carried out in rabbits with sodium hypochlorite (12.5% solution) showed corrosive effects to skin. In studies performed in rabbits and guinea pigs, sodium hypochlorite (5.25% solution) was slightly irritating to both animals skin. Solutions from 5% to 10% available chlorine, are currently classified as skin irritant, and solutions above 10%, are considered corrosive (ECHA 2007).

Serious eye damage/irritation:

Studies carried out in rabbits using sodium 12.5% hypochlorite solution was showed severe eye irritation effects, which was completely recovered after 10 weeks. At 5% solution, sodium hypochlorite was mildly to moderately irritating to the eyes of rabbits. These effects persisted for 14-21 days or more. Solutions from 5% to 10% available chlorine, are currently classified as irritant, and solutions above 10%, are considered corrosive (ECHA 2007).

Respiratory or skin sensitization:

Sodium hypochlorite has not been found to be skin sensitizer in guinea pigs sensitization studies. It is corroborated by results of studies carried out in human, in which sodium hypochlorite did not induce contact sensitization when tested according to standard skin sensitization test protocols; however, there have been rare reports of alleged allergic contact sensitization. In conclusion, given the widespread use of sodium hypochlorite, the likelihood of allergic contact sensitization due to sodium hypochlorite in practice is negligible (ECHA 2007).

Germ cell mutagenicity:There are no suitable data regarding the mutagenic potential of this substance. *In vitro* tests showed genotoxic effects in bacteria (Ames test), chromosomal aberrations in cultured mammalian cells, and sister chromatid exchanges in cultured human cells. However, genotoxicity potential has not been found in studies carried out in mice (micronucleus test, induction of aneuploidy or chromosomal aberrations). In these experimental animals it was observed abnormal sperm morphology after administration of sodium hypochlorite (WHO, 1996; IARC, 1997).**Carcinogenicity:**

There are no adequate evidences for carcinogenicity potencial in experimental animals. It is not classified as carcinogen to humans (IARC, 1997).

Reproductive toxicity:

There are no adequate data available in the literature regarding the reproductive toxicity of hypochlorite.

Specific target organ toxicity - single exposure:

Available data from human accidents, in which the few deaths that have occurred after hypochlorite ingestion are mainly attributable to aspiration pneumonia (ECHA, 2007).

Specific target organ toxicity - repeated exposure:

In subchronic studies performed in experimental animals by the oral and dermal routes, no toxicity for specific target organ was observed. The observed effects were related to the irritant properties of sodium hypochlorite (ECHA, 2007).

Aspiration hazard:

The aspiration of the sodium hypochlorite solution can cause pulmonary complications, such as acute respiratory distress syndrome, which often

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contribute to death (MTU, 1998).

12 – Ecological information**Ecotoxicity**

Toxicity on algae: There are no data available in the literature regarding the toxicity sodium hypochlorite on algae.

Toxicity on crustacea: LC₅₀ (48h): 0.037 – 2.3 mg/L (*Daphnia magna*) (U.S. EPA, 2012).

Toxicity on fishes: LC₅₀ (96h): 0.132 – 1.135 mg/L (59 µg/L) (*Oncorhynchus mykiss*) (U.S. EPA, 2012).

Persistence and degradability:

In fresh water, hypochlorites rapidly hydrolyze into non-toxic compounds when exposed to sunlight. In seawater, chlorine levels decline rapidly, however, hypobromite is formed, which is highly toxic to aquatic organisms (U.S. EPA, 1991).

Bioaccumulative potential:

There are no data available in the literature regarding the bioaccumulation potential of the hypochlorite.

Mobility in soil:

Sodium hypochlorite is highly mobile in soil (PPDB, 2011).

Other adverse effects:

It is not available.

13 – Disposal considerations**Disposal methods**

Mixture residues: If this product becomes improper for use or in disuse, contact the company Braskem S/A for devolution and final destination. Do not discard in sewers or watercourses. Disposal should be in accordance with local, state or national legislation.

Contaminated containers: Do not use the empty package. The packages should be washed and neutralized before the discard. The inadequate destination of the empty package and product waste in the environment causes soil, water and air contamination, harming fauna, flora and the population's health.

14 – Transport information**Land (Brazil):**

Brazilian Legislation: Decreto n°. 96.044 de 18 de maio de 1988. Resolução n° 420 de 12 de fevereiro de 2004.

Sea:

INTERNATIONAL MARITIME ORGANIZATION. International Maritime Dangerous Goods Code (IMDG Code, 2010).

Air:

INTERNATIONAL AIR TRANSPORT ASSOCIATION. Dangerous Goods Regulation. 53rd Edition (IATA, 2012).

Classification for land transportation (Brazil):

UN Number: 1791
Proper shipping name: HIPOCLORITO, SOLUÇÃO
Class or division: 8
Risk number: 80
Packing group: II

Classification for sea transportation:

UN Number: 1791
Proper shipping name: HYPOCHLORITE SOLUTION
Class or division: 8
Packing group: II

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Marine pollutant: Yes
EmS: F-A, S-B

Classification for air transportation:

UN Number: UN 1791
Proper shipping name: Hypochlorite solution
Class or division: 8
Packing group: II

15 – Regulatory information

This Safety Data Sheet (SDS) was prepared in accordance to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) – fourth revised edition (2011).

16 – Other information

The data herein are based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The data do not replace any guarantee regarding the products properties. It is the user's responsibility to ensure that his/her activities comply with Federal, State and Local laws.

Literature references: AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH). **Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®)**. Cincinnati, OH, 2012.

BRASIL. Decreto nº 96.044, de 18 de maio de 1988. Aprova o Regulamento para o transporte Rodoviário de Produtos Perigosos e dá outras providências. **Diário Oficial [da] União**, Poder Executivo, Brasília, DF, 19 maio 1988.

BRASIL. Ministério dos Transportes. Resolução nº 420, de 12 de fevereiro de 2004. Aprova as instruções Complementares ao Regulamento do Transporte Terrestre de Produtos Perigosos. **Diário Oficial [da] União**, Poder Executivo, Brasília, DF, 31 maio 2004.

COMPANHIA DE TECNOLOGIA DE SANEAMENTO AMBIENTAL (CETESB). **Ficha de Informação de Produto Químico:** Hipoclorito de sódio. São Paulo, Brasil, 2011. Available at: <<http://sistemasinter.cetesb.sp.gov.br/>>. Access on: Apr 4th, 2013.

EUROPEAN CHEMICALS AGENCY (ECHA). **European Union Risk Assessment Report:** Sodium hypochlorite (Final approved version). Luxembourg: Office for Official Publications of the European Communities, 2007. Available at: <<http://echa.europa.eu/documents/10162/330fee6d-3220-4db1-add3-3df9bbc2e5e5>>. Access on: Apr 4th, 2013.

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INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA). **Dangerous Goods Regulation**. 54th edition. Montreal, Canada, 2013.

INTERNATIONAL MARITIME ORGANIZATION (IMO). **International Maritime Dangerous Goods Code (IMDG Code)**. London, England, 2012.

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PLANITOX – The Science-based Toxicology Company Database.

UNIÃO EUROPEIA. REGULAMENTO (CE) Nº1282/2008 DO PARLAMENTO EUROPEU E DO CONSELHO de 16 de Dezembro de 2008 relativo à classificação, rotulagem e embalagem de substâncias e misturas, que altera e revoga as Directivas 67/548/CEE e 1999/45/CE, e altera o Regulamento (CE) Nº 1907/2006 (Texto relevante para efeitos do EEE).

Jornal Oficial da União Europeia. Bruxelas, União Europeia, L 353, p. 400 e p. 415, 31 dez. 2008. Available at: <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:353:0001:1355:pt:PDF>>. Access on: Apr 4th, 2013.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA). **MEMORANDUM: Product Chemistry, Environmental Fate and** Ecological Effects Scoping. Document in Support of Registration Review of Sodium & Calcium Hypochlorite Salts. Washington D.C., United States of America, 2012. Available at: <www.regulations.gov>. Access on: Apr 4th, 2013.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA). **R.E.D. FACTS:** Sodium and Calcium Hypochlorite Salts. Washington D.C., United States of America, 1991. Available at: <<http://www.epa.gov/oppsrrd1/REDs/factsheets/0029fact.pdf>>. Access on: Apr 4th, 2013.

Abbreviations:

ACGIH - American Conference of Governmental Industrial Hygienists.

b.w. - Body weight.

CAS - Chemical Abstract Service.

LC₅₀ - Concentration of a test substance in air or of a chemical in water which causes the death of 50% (one half) of a group of test animals (50% lethal concentration).

LD₅₀ - Amount of a test substance which causes the death of 50% (one half) of a group of test animals.

NIOSH - National Institute for Occupational Safety and Health.

OSHA - Occupational Safety and Health Administration.

PE - Polyethylene.

PPE - Personal protective equipment.

PVC - polyvinyl chloride.