Global Product Strategy (GPS) Safety Summary

Date 15.10.2013
Version 1.0

Sodium Hypochlorite

The Global Product Strategy (GPS) Safety Summary gives an overview of information on chemical products in the framework of the International Council of Chemicals Association (ICCA) initiative and is focused on the products' basic characteristics related to safe use. All the information for health, safety and environment for this specific product can be found in the extended Safety Data Sheet (e- SDS) provided by Hellenic Petroleum SA to its customers.

GENERAL INFORMATION

Sodium hypochlorite (also known as bleach) is a transparent yellowish solution in water at room temperature, manufactured in the caustic soda/chlorine plant by electrolysis of salt solutions. It is a powerful oxidant and is useful in a variety of applications, including as a disinfectant at home. If the recommendations under the section below "Risk Management Measures" are applied, the substance can be handled safely.

CHEMICAL IDENTITY

Name	Sodium Hypochlorite
Trade name	Sodium Hypochlorite
IUPAC Name	Sodium Hypochlorite
CAS Number	7681-52-9
EC Number	231-668-3
Molecular formula	NaCLO

USES AND APPLICATIONS

Sodium hypochlorite is an inorganic chemical with a wide variety of uses. It is produced and handled in the form of aqueous solutions. It is used within industry to manufacture other substances, to treat textiles and as a powerful biocide (such as treatment of water for cooling systems). The substance is used professionally to disinfect public swimming pools and public water supplies, and as a disinfectant by professional cleaners. It is used by the public as a general all-purpose disinfectant, cleaner and bleach within the home. Consumer formulations may include a spray bottle, which can form weak sodium hypochlorite aerosols.

PHYSICAL AND CHEMICAL PROPERTIES

Sodium hypochlorite is only found in aqueous solution, due to the manufacturing process. Solid sodium hypochlorite is unstable at room temperature and does not typically exist. It is a powerful oxidant found at a concentration of 12-16% w/w active chlorine for industrial use, and is most often sold for domestic household use at 1-3% w/w active chlorine.

Property	**Value**
Physical State	Liquid
Color	Colorless to light yellow
Odour	Characteristic
Density	1.3 g/cm3 (at 21,2^{o}C for 24,3% active chlorine)
Boiling point	Not determined
Melting point	-28,9^{0}C
Flash point	Not determined
Explosive properties	No explosive properties
Self-ignition temperature	Not determined
Vapor pressure	2,5kPa (20^{0}C)
Water solubility	Fully miscible
Viscosity	Kinematic: not determined Dynamic:6,4 mPa s (at 20^{0}C for 24,3% active chlorine)
Octanol-Water partition coefficient (logKow)	-3,42 at 20^{0}C

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HEALTH EFFECTS

Human health hazard assessment

The substance is corrosive and can cause burns to unprotected skin and eyes. Additionally, vapors or aerosols from the substance can cause respiratory irritation for active chlorine concentration ≥ 20% w/w.
The table below gives an overview of the health effects assessment results for sodium hypochlorite.

Effect Assessment	Result
Acute toxicity	Does not have to be classified for acute toxicity.
Irritation/corrosion	Causes severe skin burns and eye damage. May cause respiratory irritation for products with free available chlorine ≥ 20% w/w
Sensitization	Negative
Toxicity after repeated exposure	No specific target organ toxicity was detected
Genotoxicity/mutagenicity	Negative
Carcinogenicity	Not considered to be a human cancer concern
Toxic for reproduction	No adverse effects on fertility and not selectively toxic to the fetus.

ENVIRONMENTAL EFFECTS

Sodium hypochlorite is very toxic to aquatic organisms. However, as the substance is extremely reactive, any sodium hypochlorite which is poured into the drain from household use will react with organic matter and will be removed before reaching the environment. Industrial use sometimes results in the discharge of weak solutions of sodium hypochlorite directly into the environment, which is rapidly removed by reaction. Additionally, the substance is not bio accumulative and will not persist in the environment. The table below gives an overview of the environmental assessment results for sodium hypochlorite.

Effect Assessment	Result
Aquatic Toxicity	Very toxic to aquatic life (acute toxicity) Toxic to aquatic life with long lasting effects (chronic toxicity)
Fate and behavior	**Result**
Biodegradation	Not applicable for inorganic substances
Bioaccumulation potential	Not bio-accumulative
PBT/vPvB conclusion	Neither considered to be PBT nor vPvB

EXPOSURE

Human health

Worker: The exposure has been assessed as safe for professional and industrial use when the provisions laid down in the extended Safety Data Sheet are followed carefully. Some concern has been raised due to the presence of by-products from reaction of sodium hypochlorite with organic matter in swimming pools and drinking water, and the possible toxicity of these by-products. By-product formation was assessed in the OECD program and found not to pose a risk. In practice measures are taken to reduce by-product formation as much as possible, without compromising the water quality.
Consumer: Consumers may come into contact with the substance through use of household disinfectant and cleaner. The exposure has been assessed as safe if the substance is used as directed on the label, in particular avoiding mixing the substance with acids and avoiding splashes onto skin and into eyes.

Environment

Environmental exposure rarely occurs. Household waste flushed down the drain is destroyed by reaction before reaching the environment. Professional or industrial waste generally enters into waste water treatment plants, where the substance reacts and is removed before reaching the environment. If appropriately managed, the substance can be handled at all stages of manufacture and use with a minimal impact on the aquatic environment.

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RISK MANAGEMENT MEASURES

For the detailed Risk Management Measures (RMMs) please consult the extended Safety Data Sheet of this product

Industry use, production and formulation

Sodium hypochlorite should only be handled by knowledgeable and trained personnel. Make sure that there is adequate ventilation at workplace. Do not eat, drink or smoke where sodium hypochlorite is handled or stored. Use suitable chlorine detectors. In cases where contact with the material is anticipated wear appropriate chemical protective equipment.

Consumer use

Care must be taken to follow safety instructions found on bleach packaging. Ensure natural ventilation (from doors,windows).

Environment

Do not allow to reach ground water, water course or sewage system. Must not be disposed together with household garbage.

PERSONAL PROTECTIVE EQUIPMENT AND EMERGENCY MEASURES

 	➢ For short term exposure: respirator with inorganic vapor cartridge ➢ For long term exposure: full face respirator
 	➢ Suitable protective gloves and work clothing
	➢ Safety glasses skintight
First aid measures	➢ Implement emergency response procedures. Wash affected skin and eyes with plenty of water. Contaminated clothing should be removed. In case of breathing difficulties, transfer the casualty to the hospital.
Firefighting measures	➢ Suitable extinguishing media: water haze ➢ In case of fire nearby, remove exposed containers .Cool tanks with water spray.
Accidental release measures	➢ For containment: Pump into a clean labeled emergency container. Absorb with sand, diatomite, sawdust. ➢ For clean up: After cleaning, flush away traces with water

CLASSIFICATION AND LABELLING

EU-GHS Criteria (European Regulation, CLP No1272/2008)	**Sodium hypochlorite** (aqueous solution, degree of purity:25%w/w, active chlorine ≥ 5% w/w & <20%w/w)
Pictograms	  GHS05 GHS09
Signal word	Danger
Hazard class and category code	Met.Corr.1;H290 Skin Corr.1B;H314,Eye Damage 1;H318, Aquatic Acute 1;H400,Aquatic Chronic 2;H411 (M factor acute:10)
Hazard statement code	H290 May corrosive to metals H314 Causes severe skin burns and eye damage H400 Very toxic to aquatic life H411 Toxic to aquatic life with long lasting effects *Additional labeling requirement* EUH031 Contact with acids liberates toxic gas
Precautionary statements	*Prevention* P260 Do not breathe gas/mist/vapors/spray P280 Wear protective gloves/protective clothing/eye protection/face protection P273 Avoid release to the environment

	Response P303+P361+P353 IF ON SKIN (on hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower P305+P351+P338: IF ON EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing. P310 Immediately call a POISON CENTER or doctor/physician

BASIC TRANSPORT INFORMATION

UN Number :1791

STATE AGENCY REVIEW

- European Regulation EU-GHS No. 1272/2008, Index-No. 017-011-00-1
- European Regulation No793/93 (risk assessment)
- The substance has been registered under REACH Regulation No 1907/2008
- Under review for the European Biocidal Products Legislation for its uses as biocide
- OECD program for substances with High Production Volumes (HPV)
- International Chemical Safety Cards (ICSC)

CONCLUSIONS

- Sodium hypochlorite is a useful substance for many practical applications, from industry to home.
- It may be corrosive to metals. It causes severe skin burns and eye damage.
- Uses of sodium hypochlorite have been shown to be safe by careful handling and following the provided safety instructions.

CONTACT INFORMATION

- E-mail address: reach@helpe.gr
- National Emergency Centre: 166, National Poison Centre : (+30)210 7793777
- For more information on the GPS Safety Summaries follow the link : http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/

ABBREVIATIONS

ICCA :International Council of Chemical Associations
GPS: Global Product Strategy
GHS: Globally Harmonized System
CLP: Classification, Labelling, Packaging
OECD: Organisation for Economic Co-operation and Development
REACH: Registration, Evaluation, Authorisation of Chemicals
PBT/vPvB: Persistent, Bio accumulative and Toxic/very Persistent and very Bio accumulative
UN: United Nations

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