

GPS Safety Summary

Substance Name:

SODIUM CHLORATE

1. General Statement

Sodium chlorate is mainly used as bleaching agent for pulp and paper, but also as an intermediate for the synthesis of other chlorates, perchlorates and chlorite, in bleaching or oxidizing mineral compounds, in metal finishing industry and in pyrotechnics.

This substance is manufactured and handled in industrial settings in closed systems.

2. Chemical Identity

Name:	Sodium chlorate
Brand names:	Sodium chlorate, Chlorate salt of sodium, sodium salt chloric acid
Chemical name (IUPAC):	Sodium chlorate
CAS number(s):	7775-09-9
EC number:	231-887-4
Molecular formula:	ClHO ₃ .Na
Structure:	



3. Use and applications

The majority of sodium chlorate produced worldwide goes into the pulp and paper industry where it is used to generate chlorine dioxide, a key bleaching agent in the production of wood pulp for paper products.

Other applications include use as an intermediate in the synthesis of other chlorates, perchlorates and chlorite, in bleaching or oxidizing mineral compounds, in the metal finishing industry, and in pyrotechnics.

4. Physical / Chemical properties

Sodium chlorate is a white or pale yellow crystalline, oxidizing solid substance with the following physical/chemical properties.

Property	Value
Form	crystalline, powder
Physical state (Liquid/solid/gaseous)	solid at 20°C at 1013 hPa
Colour	white or pale yellow
Odour	almost odourless
Density	2.54 g/cm ³ at 20.2°C
Melting point	255.0 – 259.5°C at 954 hPa
Flammability (optional) H statement in case classified	not flammable
Explosive properties	not explosive
Self-ignition temperature	no relative self-ignition temperature
Oxidising properties	strong oxidiser
Vapour pressure	< 3.5 x 10 ⁻⁷ hPa at 25°C
Mol weight	106.45 g/mol
Water solubility	miscible: 696-736 g/L at 20°C for pH 4.49 to 8.70
Flash point	inorganic material and melting point > 250°C
Octanol-water partition coefficient (LogKow)	Kow < 0.001 and log Kow < -2.9, weakly soluble in n-octanol at 20°C

5. Health Effects

5.1 Consumer

Sodium chlorate is not used for consumer applications.

5.2 Worker

Workers will not normally come into contact with sodium chlorate, as the substance is manufactured and handled in industrial settings in closed systems. In case of unintended exposure during maintenance, sampling, testing, or other procedures, workers should follow the recommended safety procedures in the Extended Safety Datasheet (eSDS).

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Harmful if swallowed
Irritation / corrosion Skin / eye / respiratory tract	Product dust may be irritating to eyes, skin and respiratory system.
Sensitisation	Based on the available test data, not expected to cause allergic skin reactions
Toxicity after repeated exposure Oral / inhalation / dermal	Based on the available test data, not expected to cause significant target organ toxicity after repeated

GPS Safety Summary

Ref. : Arkema – Hydrogen Peroxide – Sodium Chlorate – 2012/06/30 – V0

	exposure.
Genotoxicity / Mutagenicity	Based on the available test data, not expected to cause adverse genetic effects.
Carcinogenicity	Based on the available test data, not expected to cause cancer under normal use conditions.
Toxicity for reproduction	Based on the available test data, did not cause adverse effects on reproduction or on the development of offspring.

6. Environmental Effects

Effect Assessment	Result
Aquatic Toxicity	Toxic to aquatic life with long lasting effects. The chlorate anion is not directly toxic; the mechanism of chlorate toxicity to plants is indirect. Chlorate may be reduced by the enzyme system to form toxic intermediate products, apparently chlorite or possibly hypochlorite.

Fate and behaviour	Result
Biodegradation	A valid ready biodegradability test result is not available for sodium chlorate. The biodegradation pathway proves that chlorate is reduced completely to chloride. Based on the available studies and findings, the conclusion is that sodium chlorate should be classified as readily biodegradable.
Bioaccumulation potential	Due to the logKow of -2.9 (estimated value), bioaccumulation is not expected.
PBT / vPvB conclusion	Not considered to be PBT or vPvB.

Based on available data for the pure substance, sodium chlorate is toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment. However, the potential of release to the aquatic compartment is low (see section 7.2 below). In spite of its toxicity, because the environmental exposure is low, the risk is limited. In addition, the substance is not expected to bioaccumulate and is considered as readily biodegradable; thus it will not persist in the environment.

7. Exposure

7.1 Human health

Sodium chlorate is manufactured in a closed process, which minimizes the employee exposure potential. Workers who might accidentally come into contact with the non-formulated, undiluted substance should follow the safety measures recommended in the Extended Safety Data Sheet.

Based on the risk assessment, the risk is controlled when activities are carried out under conditions recommended in the extended safety data sheet (Chap8 and exposure scenario).

7.2 Environment

The manufacture of sodium chlorate is a closed process, where potential releases are treated by on-site and off-site risk management measures.

Release in the air is expected to be limited due to the physicochemical properties (low volatility) and control systems in place at the use sites (i.e., sites producing/using solid forms should use dust filters).

Regarding the water compartment, the literature and laboratory studies indicate that more than 95% of chlorate can be removed in various forms of waste water treatment plants. In natural bodies of water, chlorate is reduced completely to chloride.

Based on the risk assessment, the use of sodium chlorate is safe under conditions recommended in the extended safety data sheet (Chap8 and exposure scenario)

8. Risk Management recommendations

Human health measures		
Organizational	A basic standard of occupational hygiene is recommended; Ensure operatives are well informed of the hazards and trained to minimise exposures	
Protection	Eye/Face protection:	Tightly fitting safety goggles
	Skin protection:	Protective suit
	Hand protection:	PVC or rubber gloves (suitable gloves tested to EN374)
	Respiratory protection:	Half mask with a particle filter P2 (EN 143)
Engineering controls	Provide appropriate exhaust ventilation at places where dust is formed. Ensure that eyewash stations and safety showers are close to workstation locations.	
Environment protective measures		
Do not flush into surface water or sanitary sewer system. Inform authorities if product contaminates rivers or lakes.		

9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information

This substance has been registered under:

- EU Regulation EC 1907/2006 (REACH)
- OECD HPV program




Sodium chlorate was included in the IPPC BREF document.

9.2 Classification and labelling

Under GHS, substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the eSDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according CLP (EC) 1272/2008.

GPS Safety Summary

Ref. : Arkema – Hydrogen Peroxide – Sodium Chlorate – 2012/06/30 – V0

Classification	
According to REGULATION (EC) no 1272/2008:	
<ul style="list-style-type: none"> – Oxidising solids; Category 1; May cause fire or explosion; strong oxidiser. – Acute toxicity; Category 4; Harmful if swallowed. – Chronic aquatic; Category 2; Toxic to aquatic life with long lasting effects. 	
Pictogram	
– GPS03: Flame	
– GHS07: Exclamation mark	
– GHS09: Environment	
Hazard statement	
<ul style="list-style-type: none"> – H271: May cause fire or explosion; strong oxidiser – H302: Harmful if swallowed. – H411: Toxic to aquatic life with long lasting effects 	
Additional classification according to GHS	
According to GHS criteria, the substance should be classified Acute Aquatic 2 only, because the conditions to classify Chronic Aquatic 2 are not met (and as a consequence, the environmental hazard pictogram does not apply); however, for consistency of the labelling reasons, Arkema recommends to classify Environmental Chronic 2 under GHS.	

10. Contact Information within Company

For further information on this substance or product safety summary in general, please contact:

- arkema-hydroperox-reach-uses@arkema.com
- **ICCA portal where the GPS Safety Summary is posted:**
<http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>
- Arkema-hydroperox-reach-uses@arkema.com

11. Date of Issues / Revision

- Date of issue: 2012-06-30
- Date of revision:

12. Disclaimer

The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk.

NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.

No liability will be accepted by ARKEMA for damages of any nature whatsoever resulting from the use of or reliance on the information.