

SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Product Name: Chlorine Liquid

Other Identifier: Sodium Hypochlorite 12.5%

Recommended Use: Pool Chlorine

Supplier: Midland Chemicals
ABN: 91 622 018 986

Street Address: 18 Elliott Street
Midvale
Western Australia

Telephone Number: +61 08 9274 1992

Facsimile: +61 08 9250 1710

Emergency Telephone: **1 800 033 111 (ALL HOURS)**

2. HAZARDS IDENTIFICATION

Road and Rail; Dangerous Goods according to the criteria of the Australian Code for the Transport of Dangerous Goods by Road & Rail (ADG Code)

Globally Harmonised System

Hazard Classification

Hazardous according to the criteria of the Globally Harmonised System of Classification and Labelling of Chemicals (GHS).

Hazard Categories

Skin Corrosion/Irritation - Category 1B
Serious Eye Damage/Irritation - Category 1
Acute Hazard To The Aquatic Environment - Category 1
Specific Target Organ Toxicity (Single Exposure) - Category 3

Pictograms



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Signal Word

Danger

Hazard Statements

EUH031 Contact with acids liberates toxic gas.
H314 Causes severe skin burns and eye damage.
H400 Very toxic to aquatic life.

Precautionary Statement

Prevention

P260 Do not breathe fume/gas/mist/vapours/spray.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection.

Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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 call a POISON CENTER or doctor/physician.
P321 Specific treatment (see First Aid Measures on Safety Data Sheet).
P363 Wash contaminated clothing before reuse.
P391 Collect spillage.

Storage:

P405 Store locked up.

Disposal

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

Poisons Schedule: 6

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Proportion
Sodium Hypochlorite	7681-52-9	12.5%
Water		Balance

4. FIRST AID MEASURES

For advice, contact a Poisons Information Centre (e.g. phone Australia 131 126; New Zealand 0800 764 766) or a doctor at once.

Inhalation:

Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. DO NOT use mouth-to-mouth respiration.

Skin Contact:

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Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Discard contaminated clothing in a manner, which limits further exposure.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately.

Ingestion:

Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of water. Get medical aid immediately.

Medical attention and special treatment:

Symptoms caused by exposure: Chlorine gas released from sodium hypochlorite causes irritation of respiratory system, consisting in coughing, difficult breathing, stomatitis, nausea and pulmonary edema. Contact with skin can cause skin irritation, followed by blisters and eczema (especially at 12% concentration). The eye contact causes serious damages of eyes. Ingestion of tens of grams of sodium hypochlorite solution (12% concentration) can cause mucous membrane burns, perforation of the esophagus and stomach, and laryngeal oedema. Medical Attention and Special Treatment: In case of eyes and face splashing, treat eyes firstly. Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

General Measures:

If safe to do so, remove containers from the path of fire.

Flammability Conditions:

Not considered to be a fire hazard. Sodium hypochlorite itself does not burn, but poisonous gases are produced in fire.

Extinguishing Media:

Suitable Extinguishing Media: Water. Use water spray to cool fire-exposed containers, to dilute liquid, and control vapour.

Fire and Explosion Hazard:

Contact with combustible materials can cause explosions. Hazchem Code: 2X

Hazards from combustion products:

Emits toxic fumes of chlorine (hypochlorous acid and sodium chlorate) when heated to decomposition. The decomposition is an exothermal process.

Special Fire Fighting Precautions:

Keep containers cool with water spray. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Wear appropriate protective clothing to prevent contact with skin and eyes. Wear a self-contained breathing apparatus (SCBA) to prevent contact with thermal decomposition products. Containers may explode when heated.

Personal protective equipment:

Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves) or chemical splash suit. Please note: Structural fire fighters uniform will provide limited protection.

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure:

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Emergency procedures, Evacuate the danger area or to consult an expert. Approach from upwind. Isolate the area. Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions. Prevent further leakage or spillage if safe to do so. Keep away from incompatible products.

Clean up Procedure:

Spills/Leaks: The spills can be neutralized using light reducing agents such as sodium sulphite sodium bisulphite or sodium thiosulphate. Do not use sulphates or bi-sulphate! Contain and recover when is possible.

Containment:

Stop leak if safe to do so – Prevent entry into waterways, drains or confined areas.

Decontamination:

Special precautions: Do not use combustible materials, such as saw dust! Do not use sulphates or bisulphates for spill neutralizing.

Environmental Precautionary Measures:

Do not allow product to reach drains, sewers or waterways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste Authority.

Evacuation Criteria:

Evacuate all unnecessary personnel.

Personnel Precautionary Measures:

Personnel involved in the clean up should wear full protective clothing as listed in section 8.

7. HANDLING AND STORAGE

This material must be stored, maintained and used in accordance with the relevant regulations.

Conditions for safe storage:

Keep in tightly closed containers, store in a cool, dry, well ventilated area. Isolate from incompatible substances. The aqueous solutions are sensitive to light and air. Avoid storage for long period because the product degrades over time. The recommended storing temperature is 15-25 C. Storage at 15 C reduces the rate of decomposition. This product has a UN classification of 1791 and a Dangerous Goods Class 8 (Corrosive) according to The Australian Code for the Transport of Dangerous goods By Road and Rail.

Precautions for safe handling:

Protect against physical damage. Personnel which handling the product must wear protective equipment for hand, skin or eyes, and including protective breathing apparatus. Area should be well ventilated. Advice on general occupational hygiene: Avoid inhalation or ingestion and contact with skin and eyes. General occupational hygiene measures are required to ensure safe handling of the substance. Chemicals should be used only by those trained in handling potentially hazardous materials. The electrical equipment should be corrosion resistant.

Container:

Materials used for storage tanks:

- polyethylene; 5-7 years life time. The outdoor tanks will be UV proof.
- glass fibre reinforced plastics – designed accordingly
- steel rubber-lined (thickness of lining - $\frac{3}{4}$ ")
- steel Halar lined (Halar is a copolymer 1:1 ethylene- chlorotrifluoroethylene) ; 3-6 years life time function of quality of lining application.
- titanium – the best material used for tank construction but because the high price is used only for specific applications.

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Incompatible materials:

reducing agents, combustible materials (wood, cellulose), organic materials, metals, acids. Materials to avoid: carbon steel, stainless steel, copper and its alloys, aluminium, unprotected metals.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits:

No Data Available

General:

HSIS Airborne Exposure Limits: Chlorine: TWA 1 ppm (3 mg/m³ peak limitation) NOTE: The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. Peak limitation is a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes. These exposure standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Exposure Limits:

No Data Available

Biological Limits:

No information available on biological limit values for this product.

Engineering Measures:

These exposure standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Personal Protective Equipment:

RESPIRATOR: Self-contained breathing apparatus with full face-piece operated in the pressure demand. For emergencies or instances where exposure levels are not known, use a full face piece positive pressure, air supplied respirator. Warning! Air -purifying respirators do not protect workers in oxygen deficient atmospheres (AS1715/1716). EYES: Chemical splash goggles and/or face shield must be worn when possibility exist for eye contact due to splashing or spraying liquid or vapor (AS1336/1337). HANDS: Wear PVC, rubber or neoprene gloves. Glove thickness has to be of minimum 1.2 mm. Do not use leather gloves (AS2161). CLOTHING: Wear impervious protective clothing including boots, lab coat, apron or coveralls and safety footwear (AS3765/2210).

Special Hazards Precautions:

No information available.

Work Hygiene Practices:

Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid
Colour: Clear Colourless
Odour: Chlorine Odour
Solubility: Miscible in water
Specific Gravity: 1.09 for 5.25% - 1.21 for 12.0%
Relative Vapour Density (air=1): No Data Available
Vapour Pressure (20 °C): 2500 Pa Pa (@ 20 °C)
Flash Point (°C): No Data Available
Flammability Limits (%): Not flammable, combustible or explosive.
Auto Ignition Temperature (°C): No Data Available
Boiling Point: 100°C approx
Melting Point (°C): No Data Available
pH: >12
Decomposition Temperature: No Data Available
Molecular Weight: No Data Available
Viscosity: 2.6 mPas (@ 20 °C)
Octanol Water Coefficient: -3.42 (calculated value)
Additional Characteristics: Specific density (water=1) 1.09 for 5.25%; 1.15 for 8.0%; 1.21 for 12.0%
Sodium hypochlorite solution is an aqueous mix of inorganic salts; therefore by heating of solution, water evaporates. At temperatures above 60C, the water evaporates with depositing of white crystals on the bottom of tank .For this reason the boiling point can not be determined

10. STABILITY AND REACTIVITY

General Information: Reactivity: Reacts violently with acids with chlorine released.
Possibility of Hazardous Reactions: Sodium hypochlorite is extremely corrosive for aluminium, brass. Reacts with metals (nickel, copper, tin) with oxygen release, with ammonia urea, oxidisable substances, ammonium nitrate, ammonium oxalate, ammonium phosphate , ammonium acetate , ammonium carbonate , cellulose and methanol.

Chemical stability: Unstable. Stability decreases with concentration, heat, light exposure, decrease in pH and contamination with heavy metals, such as nickel, cobalt, copper and iron. In practice, a factor of 2 decrease in concentration produces nearly a factor of 5 decrease in decomposition rate at any given temperature with a pH range of approximately 11 to 13. At pH

Conditions to avoid: Light, heat and incompatibles.

Incompatible materials: Incompatible materials and possible hazardous reactions: aluminum, brass, cellulose, steel, stainless steel, bronzes. Strong acids, strong oxidizers, heavy metals (which act as catalysts), reducing agents, ammonia and ammonium salts, ether, and many organic and inorganic chemicals such as paint, kerosene, paint thinners, shellac.

Hazardous decomposition products: Emits toxic fumes of chlorine (hypochlorous acid and sodium chlorate)
when heated to decomposition. The decomposition is an exothermal process.

Hazardous Polymerisation: Sodium hypochlorite is extremely corrosive for aluminium, brass. Reacts with metals (nickel, copper, tin) with oxygen release, with ammonia, urea, oxidisable substances, ammonium nitrate, ammonium oxalate, ammonium phosphate , ammonium acetate , ammonium carbonate , cellulose and methanol.

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11. TOXICOLOGICAL INFORMATION

- General Information:** Acute toxicity: Sodium Hypochlorite: Rat male Oral LD50 = 1100 mg/kg bw (for sodium hypochlorite sol.. 12% free chlorine). Mouse male Oral LD50, = 880 mg/kg bw (for sodium hypochlorite sol.. 12% free chlorine). Other routes : intra-peritoneal Rat LD 50, (1h) > 10,7 mg/L air, causes abundant tearing. Rabbit male/female LD50, >20 g/kg bw. Causes serious skin irritation. Mouse LD= 240-250mg/kg bw, Guinea pig LD: 63 mg/kg bw. Repeated dose toxicity: Oral NOAEL: 50 mg/kg bw/day Respiratory or skin sensitisation: Not sensitising Germ cell mutagenicity: No genetic toxicity effects Carcinogenicity: No carcinogenic potential Reproductive toxicity: Sodium hypochloritel has no genotoxic potential, therefore no classification is required according to 67/548/EEC and 1272/2008/EC (CLP) requirements. Information on Possible routes of exposure: Ingestion, Inhalation, Skin/ eye exposure. Interactive Effects: Sodium hypochlorite reacts rapidly with the organic molecules and cellular components, forming organic chlorinated compounds which have their own toxicity (BIBRA 1990)
- Ingestion:** Causes severe pain, nausea, vomiting, diarrhoea, and shock. May cause haemorrhaging of the digestive tract. May cause corrosion and permanent tissue destruction of the oesophagus and digestive tract. May be harmful if swallowed.
- Eye contact:** Causes eye damage. Eye damage, category 1. Eye contact causes serious burns and discomfort.
- Skin contact:** Light irritant at low concentrations. Moderate irritant at medium concentrations (>5%). Corrosive at concentration higher than 10%. Skin corrosive category 1B.
- Inhalation:** Irritant. Inhalation of sprayed solution and vapours can cause respiratory system irritation caught, difficulty of breathing, stomatitis, nausea and pulmonary edema. Classified as STOT Single Exposure 3.
- Long Term Effects:** Prolonged inhalation may cause respiratory tract inflammation and lung damage. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated eye contact may cause conjunctivitis to serious eye damage..

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12. ECOLOGICAL INFORMATION

Ecotoxicity Aquatic Toxicity Tests demonstrate NOEC (7 days)= 0,0021 mg/L. Factor M=10. Short-term toxicity to invertebrates (molluscs, Daphnia magna, Ceriodaphnia dubia) - Fresh water: EC50/LC50 =0,141 mg/L - Marine water: EC50/LC50 =0.026 mg/L Long-term toxicity to invertebrates - Marine water: LC100 (36days) 0,005mg/L - NOEC for aquatic invertebrates = 0.007 mg/L Short-term toxicity to fish - Fresh water LC 50 =0,06 mg/l - Marine water LC 50= 0.032 mg/l Long-term toxicity to fish - Marine water: NOEC= 0,04 mg CPO/L Short-term toxicity to algae and aquatic plants: Not applicable , sodium hypochlorite decomposes rapidly . Long-term toxicity to algae and aquatic plants - Fresh water EC50/LC50=0,1 mg/l - Marine water EC10/LC10 or NOEC =0,02 mg/L PNEC (Predicted No Effect Concentration) PNEC fresh water = Minimum long-term aquatic toxicity/10 = 0.21 µg/L PNEC marine water = Minimum long-term aquatic toxicity /50 = 0.042 µg/L Toxicity to sediment micro-organisms There are not predicted exposures due the fact that sodium hypochlorite is destroyed quickly by oxy-reduction. Sodium hypochlorite can not exist in presence of organic carbon. PNEC=0 fresh water sediment / marine water sediment. Terrestrial toxicity Short/long -term toxicity to terrestrial invertebrates Substance is not absorbed in soil and is not persistent in soil. TD50

Persistence and Degradability

Biotic: The inorganic water can not be tested for biodegradability. **Abiotic:** Hypochlorite degrades quickly during the transport through sewage system. Photo-transforming (Photolysis) Atmospheric degradation: At medium pH (6, 5-8, 5) value, half of sodium hypochlorite is present as hypochlorous acid and the other half is dissociate as hypochlorite ions. In the atmosphere, hypochlorous acid degrades, generating atomic chlorine, which is destroyed by UV radiation. The half life is 15 days. Does not react with ozone layer. Photolysis in water Half-life for sodium hypochlorite solution, active chlorine 12-15%, at 25°C is 220 days. In presence of light, the half-life decreases 3-4 times. The UV radiation decomposes the hypochlorite, generating chlorate, chlorite and oxygen: $3 \text{ClO}^- \Rightarrow \text{ClO}_3^- + 2 \text{Cl}^-$ (1) $2 \text{ClO}^- \Rightarrow 2 \text{Cl}^- + \text{O}_2$ (2) In water, under photolysis, sodium hypochlorite with concentration of 13-18 mg/L, has a half-life of 12 min. at pH =8 . This increases up to 60 min. with pH decreasing

Mobility: At medium pH (6,5-8,5) value, half of sodium hypochlorite is present as hypochlorous acid and the other half is dissociate as hypochlorite ions. The absorption of hypochlorous acid particles, the air volatilization and soil absorption are very low. Thus, hypochlorite remains in aqueous phase and degrades to chlorine.

Environmental fate: Do NOT let product reach waterways, drains and sewers.

Bioaccumulation: Hypochlorite reacts instantaneously with organic and oxidant materials. Has not potential for bioaccumulation. PBT/vPvB: Hypochlorite does not fulfil the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).

Environmental Impact: No Data Available

13. DISPOSAL CONSIDERATIONS

Disposal methods: Dispose of in accordance with all local, state and federal regulations. All empty packaging should be disposed of in accordance with Local, State, and Federal Regulations or recycled/reconditioned at an approved facility. Waste packaging should be recycled. Empty containers or liners may retain some

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product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Special Precautions for Land Fill

Contact a specialist disposal company or the local waste regulator for advice. Incineration or landfill should only be considered when recycling is not feasible.

14. TRANSPORT INFORMATION

Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for transport by Road and Rail; DANGEROUS GOODS.

UN No: 1791

Class-Primary: 8 Corrosive Substances

Packing Group: III

Proper Shipping Name: HYPOCHLORITE SOLUTION

Hazchem Code: 2X

Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea; DANGEROUS GOODS.

UN No: 1791

Class-Primary: 8 Corrosive Substances

Packing Group: III

Proper Shipping Name: HYPOCHLORITE SOLUTION

Hazchem Code: 2X

Air Transport

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air; DANGEROUS GOODS.

UN No: 1791

Class-Primary: 8 Corrosive Substances

Packing Group: III

Proper Shipping Name: HYPOCHLORITE SOLUTION

Hazchem Code: 2X

15. REGULATORY INFORMATION

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Globally Harmonised System

Hazard Classification

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Hazard Categories

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Serious Eye Damage/Irritation - Category 1

Acute Hazard To The Aquatic Environment - Category 1

Specific Target Organ Toxicity (Single Exposure) - Category 3

Pictograms



Signal Word

Danger

Hazard Statements

EUH031 Contact with acids liberates toxic gas.

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Precautionary Statement

Prevention

P260 Do not breathe fume/gas/mist/vapours/spray.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection.

Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing.

Rinse skin with water/shower.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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 call a POISON CENTER or doctor/physician.

P321 Specific treatment (see First Aid Measures on Safety Data Sheet).

P363 Wash contaminated clothing before reuse.

P391 Collect spillage.

Storage:

P405 Store locked up.

Disposal

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

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Poisons Schedule: 6

16. OTHER INFORMATION

This material safety data sheet has been prepared by Midland Chemicals

This MSDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. No liability is accepted whether direct or indirect from its application since the conditions of final use are outside Midland Chemicals control. The end user is obliged to conform to relevant government regulations and/or patent laws applicable in their respective States of Countries.