

MATERIAL SAFETY DATA SHEET

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SECTION 1 - IDENTIFICATION

PRODUCT IDENTIFIER:	CHLORINE
PRODUCT USE:	Pulp bleaching, water treatment, manufacture of plastics, organic and inorganic chlorides, refrigerants, and pharmaceuticals.
MANUFACTURER:	Canexus Chemicals Canada Limited Partnership 100 Amherst Avenue North Vancouver, British Columbia, Canada V7H 1S4 Emergency, call: (604) 929-3441 To Request an MSDS, call: 1-800-699-6924

This MSDS is available in French upon request.

Cette fiche signalétique est disponible en français sur demande.

SECTION 2 - HAZARDS IDENTIFICATION

WHMIS CLASSIFICATION:

A - Compressed Gas



C - Oxidizing Material



D1A - Very Toxic Material causing immediate and serious toxic effects



D2A - Toxic Material causing other toxic effects

E - Corrosive Material



EMERGENCY OVERVIEW:

Greenish-yellow gas or clear amber liquid (under pressure) with a pungent odour. Compressed gas. Strong oxidizer. Contact with combustible material may cause fire or explosion. Combines with water to form corrosive hydrochloric and hypochlorous acids. Corrosive to the respiratory tract, eyes and skin. Very toxic. Can cause immediate death.

EFFECTS OF SHORT-TERM (ACUTE) EXPOSURE:

INHALATION: Chlorine is a severe nose, throat and upper respiratory tract irritant. Slight itching of the nose can occur at 0.2 ppm. At 1.0 ppm, scratchiness and dryness of the throat, coughing and minor difficulty breathing can occur. Severe shortness of breath and violent headache occur after exposure at 1.3 ppm for 30 minutes. Immediately dangerous to life or health (IDLH) at 10 ppm. Above 30 ppm, intense coughing, choking, chest pain and vomiting occur. Bronchitis and accumulation of fluid in the lungs may develop after severe exposure. High concentrations may cause death.

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SKIN CONTACT: High concentrations of chlorine gas can cause severe irritation. Symptoms include burning and prickling sensations, reddening and blisters. Direct contact with liquid chlorine causes severe local irritation, burns and possibly frostbite.

EYE CONTACT: Chlorine gas is a severe irritant to the eyes. Symptoms include a stinging and burning sensation with tearing. Direct contact with liquid chlorine may cause burns, permanent damage, and possibly blindness.

INGESTION: Not applicable to gaseous chlorine.

EFFECTS OF LONG-TERM (CHRONIC) EXPOSURE:

Repeated and prolonged exposure at 5 ppm may cause respiratory effects, inflammation of the nose and corrosion of tooth enamel. No evidence of carcinogenicity in human or animal studies. Chlorine is unlikely to accumulate in the body since it reacts with water and tissues.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Pre-existing respiratory disorders.

SECTION 3 – COMPOSITION

HAZARDOUS INGREDIENTS	% (w/w)	CAS NUMBER
Chlorine	99.5	7782-50-5

SECTION 4 - FIRST AID MEASURES

INHALATION: Take precautions to ensure your own safety before attempting rescue. Wear appropriate personal protective equipment and use the 'buddy' system. Remove source of chlorine or remove victim to fresh air. If breathing has stopped, a trained person should begin artificial respiration, or if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Oxygen may be beneficial if administered by a suitably trained person. Obtain medical attention immediately.

SKIN CONTACT: Immediately flush contaminated areas with lukewarm, gently running water for at least 20 minutes. Remove contaminated clothing. If irritation persists, obtain medical attention immediately. Use cold packs to reduce pain.

EYE CONTACT: Immediately flush contaminated eye(s) with lukewarm, gently running water for at least 30 minutes, by the clock, while holding the eyelid(s) open. Take care not to rinse contaminated water into a non-affected eye. If irritation persists, obtain medical attention immediately.

INGESTION: Not applicable to gaseous chlorine.

GENERAL COMMENTS: Provide general supportive measures (comfort, warmth, rest). Seek medical attention for all exposures except minor instances of inhalation or skin contact. First-aid procedures should be reviewed by appropriate personnel familiar with chlorine and its conditions of use in the workplace.

SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT:	Does not burn, but strong oxidizer and fire risk	LOWER FLAMMABILITY LIMITS:	Not applicable	SENSITIVITY TO MECHANICAL IMPACT:	Not sensitive
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HAZARDOUS COMBUSTION PRODUCTS: Toxic products are formed when combustible materials burn in chlorine.

EXTINGUISHING MEDIA: Small fires: Dry chemical or carbon dioxide (CO₂). Large fires: Water spray, fog or foam as suitable for surrounding media.

FIRE FIGHTING INSTRUCTIONS: Wear adequate personal protective equipment. Remove chlorine containers from fire area if safe to do so. Use water to keep fire-exposed containers cool. Use water spray to direct escaping gas away from

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persons, such as when trying to stop the flow of gas. Use water with caution as chlorine in water may be very corrosive. Ventilate area. Chlorine gas is heavier than air and will collect in low areas.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD INDEX:

HEALTH: 4 - May be fatal on short exposure. Specialized protective equipment required

FLAMMABILITY: 0 - Not combustible

REACTIVITY: 0 - Not reactive when mixed with water.

SPECIFIC HAZARDS: Oxidizing agent

SECTION 6 - ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTION: Evacuate unnecessary personnel from release area and keep unprotected persons upwind. Wear appropriate personal protective equipment including respiratory protection.

ENVIRONMENTAL PRECAUTIONS: Stop or reduce leak if safe to do so. Prevent chlorine from entering confined spaces, sewers or waterways.

REMEDIATION MEASURES: Restrict access to area until completion of cleanup. Ensure cleanup is conducted by trained personnel only. Extinguish or remove all sources of ignition. Ventilate area. Chlorine gas is heavier than air and will collect in low areas. Chlorine gas may be absorbed in alkaline solutions with a pH above 10. Notify government occupational health and safety and environmental authorities as per applicable regulations. In the United States, releases over 10 pounds must be reported to the National Response Center at 1-800-424-8802.

SECTION 7 - HANDLING AND STORAGE

HANDLING: Follow safe handling practices for compressed gas cylinders as described by the Compressed Gas Association or the relevant agency in the country where the product is used. Regularly inspect and test piping and containment for chlorine service according to Chlorine Institute guidelines. Have emergency equipment readily available.

STORAGE: Store containers in a well ventilated area of low fire potential and away from incompatible materials. Cylinder temperature should never exceed 51 degrees C or 125 degrees F. Avoid storage of cylinders for more than 6 months. Protect containers from weather and physical damage.

SECTION 8 - EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE LIMITS:

ACGIH TLV-C: 0.5 ppm A4, Not classifiable as a human carcinogen

ACGIH TLV- STEL: 1.0 ppm

OSHA PEL-TWA: 0.5 ppm

ENGINEERING CONTROLS: Use general or local exhaust ventilation to maintain exposure below the exposure limits. These controls may need to be augmented by the use of process or personnel enclosures, control of process conditions, or by process modification.

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RESPIRATORY PROTECTION:

NIOSH recommendations for chlorine concentrations in air:

Up to 5 ppm: Chemical cartridge respirator with chlorine cartridge(s), or Supplied Air Respirator (SAR). Up to 10 ppm: SAR operated in continuous flow mode, or powered air-purifying respirator with chlorine cartridge(s), or full-facepiece chemical cartridge respirator with chlorine cartridge(s), or full face-piece SCBA, or full face-piece SAR.

IDLH Conditions (10 ppm) or Planned Entry in Unknown Concentrations: Positive pressure, full face-piece SCBA, or positive pressure full face-piece SAR with an auxiliary positive pressure SCBA.

Escape: Gas mask with canister, or escape type SCBA.

NOTE: Air purifying respirators do not protect against oxygen deficient atmospheres.

In Brazil, use equipment with certificate of approval emitted by the Ministry of Labour.

SKIN PROTECTION: Wear impervious gloves and boots and/or other protective clothing according to circumstances. Some operations may require the use of an impervious full-body encapsulating suit.

EYE AND FACE PROTECTION: Eye protection is required. Chemical safety goggles are recommended. The wearing of contact lenses is not recommended.

OTHER: Have a safety shower and eye wash station readily available in the immediate work area.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Amber liquid or greenish-yellow gas.	MELTING POINT:	-101 °C
ODOUR:	Pungent. Detection at 0.2-0.4 ppm, but unreliable.	BOILING POINT:	-34 °C
pH:	Reacts with water to produce acid solutions.	CRITICAL TEMPERATURE:	144 °C
VAPOUR PRESSURE:	638.4 kPa (6.3 atmospheres) at 20 °C	RELATIVE DENSITY:	1.33 @ 15.6 °C
SOLUBILITY:	Slightly soluble in water and soluble alkalis, but reacts liberating heat.	PARTITION COEFFICIENT: n-OCTANOL/WATER	Not applicable.
VAPOUR DENSITY:	2.5 (air = 1)	EVAPORATION RATE:	Not applicable.

SECTION 10 - STABILITY AND REACTIVITY

CHEMICAL STABILITY: Dry chlorine is stable in steel containers at normal ambient conditions.

INCOMPATIBILITY: Chlorine is extremely reactive. Liquid or gaseous chlorine can react violently with many combustible materials, and other chemicals, including water. Metal halides, carbon, finely divided metals and sulphides can accelerate the rate of chlorine reactions. Chlorine is extremely corrosive to most metals in the presence of moisture (>150 ppm water) or at high temperatures. Combines with water to produce hydrochloric and hypochlorous acid. Chlorine reacts with carbon monoxide to produce toxic phosgene, and sulphur dioxide to produce sulfuryl chloride.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION: Will not occur.

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SECTION 11 - TOXICOLOGICAL INFORMATION

ACUTE EFFECTS:

LC50 Mouse: 137 ppm/1hr

LC50 Male rat: 260-344 ppm/1hr

CARCINOGENICITY: ACGIH: A4, Not classifiable as a human carcinogen

SENSITIZATION: Not a sensitizer

TERATOGENICITY: No information available

REPRODUCTIVE EFFECTS: No information available

MUTAGENICITY: No information available

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

LC50 Daphnia magna: 0.097 mg/L/30 min

LC50 Daphnia magna: 0.063 mg/L/60 min

LC50 Yellow perch: 0.88 mg/L/60 min

Can cause immediate damage to wildlife and plants.

ECOLOGICAL FATE INFORMATION:

Unlikely to accumulate due to reactivity with moisture and tissues.

SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose the contents of a leaking cylinder to a safe out-of-door area or a hood with forced ventilation. Attached an appropriate control valve with a trap or check valve and a long piece of flexible hose connected to the valve outlet. Discharge the gas at a moderate rate into an adequate amount of about 15% aqueous sodium hydroxide or other alkali in a suitable container. When all the gas has been discharged, close the cylinder valve and transport the resulting salt solution to the plant treating unit for neutralization and disposal. The cylinder should be tagged as defective and returned to the supplier according to its directions. Follow all federal, provincial/state, and local regulations. Consult with your local supplier for additional information. Residue in empty containers can be dangerous.

SECTION 14 - TRANSPORT INFORMATION

CANADIAN TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

|| Chlorine, Class 2.3; 8 UN1017

ERAP Index QUANTITY RESTRICTION: 500 kg

US DOT HAZARDOUS MATERIALS REGULATIONS:

Chlorine, 2.3 (Poison gas), 8 (Corrosive), UN1017

Corrosive subsidiary label is required. Classified as a Marine Pollutant. Reportable Quantity, RQ = 10 lbs.

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BRAZILIAN TRANSPORTATION REQUIREMENTS:

Decreto Lei N 96.044 de 18.05.88: Regulamentação do Transporte Rodoviário de Produtos Perigosos

Portaria MT 204 de 20.05.1997: Instrução Complementar aos Regulamentos dos Transportes Rodoviários e Ferroviários de Produtos Perigosos

NBR 7500: Símbolos de Risco e Manuseio para o Transporte e Armazenagem de Materiais

NBR 7501: Terminologia - Transporte de Produtos Perigosos

NBR 7502: Transporte de Cargas Perigosas - Classificação

NBR 7503: Ficha de Emergência para o Transporte de Produto Perigoso - Características e Dimensões

NBR 7504: Envelope para o Transporte de Produtos Perigosos - Dimensões e Utilização

NBR 8285: Preenchimento da Ficha de Emergência para o Transporte de Produtos Perigosos - Procedimento

NBR 8286: Emprego de Simbologia para o Transporte de Produtos Perigosos - Procedimentos

NBR 9734: Conjunto de Equipamentos de Proteção Individual para Avaliação de Emergência e Fuga no Transporte Rodoviário de Produtos Perigosos – Procedimentos

NBR 9735: Conjunto de Equipamentos para Emergência no Transporte Rodoviário de Produtos Perigosos - Procedimentos

SECTION 15 - REGULATORY INFORMATION

CANADIAN FEDERAL REGULATIONS: (not a comprehensive list)

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): Chlorine on the Domestic Substances List (DSL).

WHMIS CLASSIFICATION:

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C - Oxidizing Material

D1A - Very Toxic Material causing immediate and serious toxic effects

D2A - Toxic Material causing other toxic effects

E - Corrosive Material

WHMIS INGREDIENT DISCLOSURE LIST: Yes, 1%

CPR COMPLIANCE

This product has been classified with the hazard criteria of the CPR, and the MSDS contains all the information required by CPR.

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UNITED STATES FEDERAL REGULATIONS: (not a comprehensive list)

TOXIC SUBSTANCES CONTROL ACT (TSCA): Chlorine is listed on the inventory.

OSHA: Hazardous Substance under 29 CFR Section 1910, Subpart Z.

CERCLA: Hazardous Substance under 40 CFR Part 302, RQ = 10 lbs.

SARA 313: Toxic Chemical subject to the reporting requirements of 40 CFR Part 372

SARA 311/312 EPA HAZARD CATEGORIES: Immediate (Acute) Health, Sudden Release of Pressure

SARA 302: Extremely Hazardous Substance, Threshold Planning Quantity = 100 lbs.

NSF

|| This product has been certified to NSF/ANSI Standard 60 (Certificate number 07870/07871B).

SECTION 16 - OTHER INFORMATION

VERSION:	1.2
PREPARED BY:	Canexus Chemicals Responsible Care Department. If you have any questions, contact Canexus at: 1-800-699-6924
REVISIONS:	Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document. Company changed from Nexen to Canexus on August 18, 2005.