

SAFETY DATA SHEETS

According to the UN GHS revision 10

Version: 1.1
Creation Date: July 15, 2024
Revision Date: August 09, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Chlorine

1.2 Other means of identification

Product number CCNP900150

Other names -

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.

Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.

Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou

Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175

Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Gases under pressure: Compressed gas

Oxidizing gases, Category 1

Skin irritation, Category 2

Eye irritation, Category 2

Acute toxicity - Category 3, Inhalation

Specific target organ toxicity – single exposure, Category 3

Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word Danger

Hazard statement(s) H270 May cause or intensify fire; oxidizer

H315 Causes skin irritation

H319 Causes serious eye irritation

H331 Toxic if inhaled

H335 May cause respiratory irritation

H400 Very toxic to aquatic life

Precautionary statement(s)

Prevention

P220 Keep away from clothing and other combustible materials.

P244 Keep valves and fittings free from oil and grease.

P264 Wash ... thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

Response	P370+P376 In case of fire: Stop leak if safe to do so. P302+P352 IF ON SKIN: Wash with plenty of water/... P321 Specific treatment (see ... on this label). P332+P317 If skin irritation occurs: Get medical help. P362+P364 Take off contaminated clothing and wash it before reuse. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P316 Get emergency medical help immediately. P319 Get medical help if you feel unwell. P391 Collect spillage.
Storage	P410+P403 Protect from sunlight. Store in a well-ventilated place. P403 Store in a well-ventilated place. P403+P233 Store in a well-ventilated place. Keep container tightly closed. P405 Store locked up.
Disposal	P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Chlorine	Chlorine	7782-50-5	231-959-5	≈ 99%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer immediately for medical attention. Artificial respiration may be needed. See Notes.

Following skin contact

First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer immediately for medical attention.

Following eye contact

Rinse with plenty of water for several minutes (remove contact lenses if easily possible). Refer immediately for medical attention.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

4.2 Most important symptoms/effects, acute and delayed

Poisonous; may be fatal if inhaled. Contact may cause burns to skin and eyes. Bronchitis or chronic lung conditions. (EPA, 1998)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

PREHOSPITAL/ ABC Reminders for treating victims in the Hot Zone: Quickly access for a patent airway, ensure adequate respiration and pulse. ... Victim Removal: If victims can walk, lead them out of the Hot Zone to the Decontamination Zone. Victims who are unable to walk may be removed on backboards or gurneys; if these are not available, carefully carry or drag victims to safety. Consider appropriate management of chemically contaminated children, such as measures to reduce separation anxiety if a child is separated from a parent or other adult. ABC Reminders for treating victims in the Decontamination Zone: Quickly access for a patent airway. ... Ensure adequate respiration and pulse. Administer supplemental oxygen as required and establish intravenous access if necessary. Place on a cardiac monitor. Watch for signs of airway swelling and obstruction such as progressive hoarseness, stridor, or cyanosis. ABC Reminders for treating victims transferred to the Support Zone: Quickly access for a patent airway. ... Ensure adequate respiration and pulse. Administer supplemental oxygen as required and establish intravenous access if necessary. Place on a cardiac monitor. Watch for signs of airway swelling and obstruction such as progressive hoarseness, stridor, or cyanosis.

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

5.2 Specific hazards arising from the chemical

May ignite other combustible materials (wood, paper, oil, etc.). Mixture with fuels may cause explosion. Container may explode in heat of fire. Vapor explosion and poison hazard indoors, outdoors or in sewers. Hydrogen and chlorine mixtures (5-95%) are exploded by almost any form of energy (heat, sunlight, sparks, etc.). May combine with water or steam to produce toxic and corrosive fumes of hydrochloric acid. Emits highly toxic fumes when heated. Avoid plastics and rubber. Avoid heat and contact with hydrogen gas or powdered metals. (EPA, 1998)

5.3 Special protective actions for fire-fighters

In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep cylinder cool by spraying with water. NO direct contact with water.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Shut off cylinder if possible. Isolate the area until the gas has dispersed. NEVER direct water jet on liquid. Remove gas with fine water spray. Do NOT let this chemical enter the environment.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation. Shut off cylinder if possible. Isolate the area until the gas has dispersed. NEVER direct water jet on liquid. Remove gas with fine water spray. Do NOT let this chemical enter the environment.

6.3 Methods and materials for containment and cleaning up

ACCIDENTAL RELEASE MEASURES: Personal precautions, protective equipment and emergency procedures: Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided. Methods and materials for containment and cleaning up: Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO contact with incompatible materials: See Chemical Dangers Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

7.2 Conditions for safe storage, including any incompatibilities

Fireproof if in building. Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. See Chemical Dangers. Cool. Dry. Keep in a well-ventilated room. Store in an area without drain or sewer access. Keep container tightly closed in a dry and well-ventilated place. Contents under pressure. Storage class (TRGS 510): Gases.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.1 ppm as TWA; 0.4 ppm as STEL; A4 (not classifiable as a human carcinogen). MAK: peak limitation category: I(1); pregnancy risk group: C. EU-OEL: 1.5 mg/m³, 0.5 ppm as STEL

Biological limit values

no data available

8.2 Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

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

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Cold-insulating gloves. Protective clothing.

Respiratory protection

Use breathing protection, closed system or ventilation.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Chlorine is a greenish yellow gas with a pungent suffocating odor. Toxic by inhalation. Slightly soluble in water. Liquefies at -35°C and room pressure. Readily liquefied by pressure applied at room temperature. Density (as a liquid) 13.0 lb / gal. Contact with unconfined liquid can cause frostbite by evaporative cooling. Does not burn but, like oxygen, supports combustion. Long-term inhalation of low concentrations or short-term inhalation of high concentrations has ill effects. Vapors are much heavier than air and tend to settle in low areas. Contact CHEMTREC to activate chlorine response team 800-424-9300. Used to purify water, bleach wood pulp, and to make other chemicals. Rate of onset: Immediate to hours Persistence: Minutes to hours Odor threshold: 3.5 ppm Source/use/other hazard: Cleaner/disinfectant in many industries; water treatment; WWI war gas; irritating corr fumes heavier than air.
Colour	Yellowish-green gas
Odour	Suffocating odor
Melting point/freezing point	-101°C
Boiling point or initial boiling point and boiling range	?34°C(lit.)
Flammability	Not combustible but enhances combustion of other substances. Many reactions may cause fire or explosion.
Lower and upper explosion limit/flammability limit	no data available
Flash point	no data available
Auto-ignition temperature	Not flammable (USCG, 1999)
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	0.134 mPa.sec at 20 deg C (gas); 0.346 mPa.sec at 20 deg C (liquid)
Solubility	0.7 % (NIOSH, 2016)
Partition coefficient n-octanol/water	log Kow = 0.85 (est)
Vapour pressure	4800 mm Hg (20 °C)
Density and/or relative density	1.468 (0°C)
Relative vapour density	2.48 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The solution in water is a strong acid. It reacts violently with bases and is corrosive. The substance is a strong oxidant. Reacts violently with combustible substances and reducing agents. The substance reacts with most organic and inorganic compounds, causing fire and explosion hazard. Attacks metals, some forms of plastic, rubber and coatings.

In water, chlorine is a strong acid, corrosive, and an oxidizer. In water, it forms hydrochloric acid (HCl) and hypochlorous acid (ClHO). Chlorine attacks plastic, rubber, coatings, and many metals in the presence of water. Chlorine reacts violently with bases, many organic compounds, ammonia, hydrogen, and many finely divided metals. Chlorine forms halides with all elements except helium, neon, and argon.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Most combustibles will burn in chlorine, forming irritating and toxic gases. Cylinders may vent rapidly or explode when heated. Flame impingement upon steel chlorine container will result in iron/chlorine fire causing rupture of the container. The gas is heavier than air. Vapors are heavier than air. They will spread along the ground and collect and stay in poorly-ventilated, low-lying, or confined areas (e.g., sewers, basements, and tanks). Hazardous concentrations may develop quickly in enclosed, poorly-ventilated, or low-lying areas. Keep out of these areas. Stay upwind. CHLORINE reacts explosively with or supports the burning of numerous common materials. Ignites steel at 100° C in the presence of soot, rust, carbon, or other catalysts. Ignites dry steel wool at 50° C. Reacts as either a liquid or gas with alcohols (explosion), molten aluminum (explosion), silane (explosion), bromine pentafluoride, carbon disulfide (explosion catalyzed by iron), 1-chloro-2-propyne (excess chlorine causes an explosion), dibutyl phthalate (explosion at 118° C), diethyl ether (ignition), diethyl zinc (ignition), glycerol (explosion at 70-80° C), methane over yellow mercury oxide (explosion), acetylene (explosion initiated by sunlight or heating), ethylene over mercury, mercury(I) oxide, or silver(I) oxide (explosion initiated by heat or light), gasoline (exothermic reaction then detonation), naphtha-sodium hydroxide mixture (violent explosion), zinc chloride (exothermic reaction), wax (explosion), hydrogen (explosion initiated by light). Reacts as either a liquid or gas with carbides of iron, uranium and zirconium, with hydrides of potassium sodium and copper, with tin, aluminum powder, vanadium powder, aluminum foil, brass foil, copper foil, calcium powder, iron wire, manganese powder, potassium, antimony powder, bismuth, germanium, magnesium, sodium, and zinc. Causes ignition and a mild explosion when bubbled through cold methanol. Explodes or ignites if mixed in excess with ammonia and warmed. Causes ignition in contact with hydrazine, hydroxylamine, and calcium nitride. Forms explosive nitrogen trichloride from biuret contaminated with cyanuric acid. Readily forms an explosive N-chloro derivative with aziridine. Ignites or explodes with arsine, phosphine, silane, diborane, stibine, red phosphorus, white phosphorus, boron, active carbon, silicon, arsenic. Ignites sulfides at ambient temperature. Ignites (as a liquid) synthetic and natural rubber. Ignites trialkylboranes and tungsten dioxide.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Incompatible materials: Alcohols.

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions - Nature of decomposition products not known.

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: LC50 mouse inhalation 137 ppm/1 hr
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

A4; Not classifiable as a human carcinogen.

Reproductive toxicity

No information is available on the developmental or reproductive effects of chlorine in humans or animals via inhalation exposure. Animal studies have demonstrated no evidence of reproductive or developmental effects from ingestion exposure to chlorine. Since chlorine is highly reactive, uptake at sites such as the ovaries and testes which are remote from the respiratory tract, is anticipated to be minimal.

STOT-single exposure

Lachrymation. The substance is corrosive to the eyes, skin and respiratory tract. Rapid evaporation of the liquid may cause frostbite. Inhalation may cause asthma-like reactions. Inhalation may cause pneumonitis. Inhalation may cause lung oedema, but only after initial corrosive effects on eyes and/or airways have become manifest. See Notes. Exposure could cause death.

STOT-repeated exposure

The substance may have effects on the respiratory tract and lungs. This may result in chronic inflammation and impaired functions. The substance may have effects on the teeth. This may result in erosion.

Aspiration hazard

On loss of containment, a harmful concentration of this gas in the air will be reached very quickly.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: *Micropterus salmoides* (Largemouth bass); Concentration: 0.74 mg/L for 1 hr /Conditions of bioassay not specified in source examined
- Toxicity to daphnia and other aquatic invertebrates: LC50; Species: *Daphnia magna* (Water flea); Concentration: 0.097 mg/L for 30 min /Conditions of bioassay not specified in source examined
- Toxicity to algae: no data available
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

Chlorine is not expected to bioaccumulate or bioconcentrate in plants or animals since it reacts with the moist tissues of living systems(1,2).

12.4 Mobility in soil

no data available

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

14.1 UN Number

ADR/RID: UN3520 (For reference only, please check.) IMDG: UN3520 (For reference only, please check.) IATA: UN3520 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: CHLORINE, ADSORBED (For reference only, please check.) IMDG: CHLORINE, ADSORBED (For reference only, please check.) IATA: CHLORINE, ADSORBED (For reference only, please check.)

14.3 Transport hazard class(es)

ADR/RID: 2.3 (For reference only, please check.) IMDG: 2.3 (For reference only, please check.) IATA: 2.3 (For reference only, please check.)

14.4 Packing group, if applicable

ADR/RID: (For reference only, please check.) IMDG: (For reference only, please check.) IATA: (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: Yes IMDG: Yes IATA: Yes

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Chlorine	Chlorine	7782-50-5	231-959-5
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2024
Revision Date August 09, 2025

Abbreviations and acronyms

- CAS: Chemical Abstracts Service
- ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
- RID: Regulation concerning the International Carriage of Dangerous Goods by Rail
- IMDG: International Maritime Dangerous Goods
- IATA: International Air Transportation Association
- TWA: Time Weighted Average
- STEL: Short term exposure limit
- LC50: Lethal Concentration 50%
- LD50: Lethal Dose 50%

- EC50: Effective Concentration 50%

References

- IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>
- HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>
- IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>
- eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>
- ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>
- ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>
- Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>
- ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

Other Information

The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. Do NOT spray water on a leaking cylinder (to prevent corrosion of the cylinder). Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

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