

Chlorine

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
 Date of issue: 06/30/2016 Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form : Substance
 Name : Chlorine
 CAS No : 7782-50-5
 Formula : Cl₂

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Industrial uses: Uses of substances as such or in preparations at industrial sites
 Manufacture of textiles, leather, fur
 Manufacture of pulp, paper and paper products
 Manufacture of bulk, large scale chemicals (including petroleum products)
 Manufacture of fine chemicals
 Manufacture of other non-metallic mineral products, e.g. plasters, cement
 Manufacture of basic metals, including alloys
 Manufacture of computer, electronic and optical products, electrical equipment

1.3. Details of the supplier of the safety data sheet

MSSA S.A.S.
 111, Rue de la Volta - Pomblière
 SAINT-MARCEL, 73600 - France
 T +33 (0)4 79 24 70 70 - F +33 (0)4 79 24 70 50
fds-msds@metauxspeciaux.fr

1.4. Emergency telephone number

Country	Organisation/Company	Address	Emergency number	Comment
USA	CHEMTREC	2900 Fairview Park Drive Falls Church, VA 22042-4513	1-800-424-9300 1-703-527-3887 (Collect)	CHEMTREC Acct. Name: MSSA CHEMTREC Acct # 14341

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

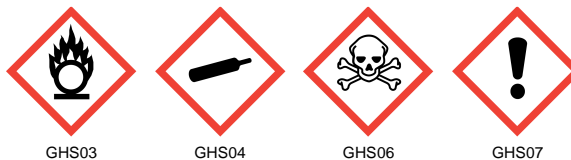
Oxidising Gases, Category 1 H270
 Gases under pressure : Liquefied gas H280
 Acute toxicity (inhalation:gas) Category 2 H330
 Skin corrosion/irritation, Category 2 H315
 Serious eye damage/eye irritation, Category 2A H319
 Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation H335

Full text of H statements : see section 16

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H270 - May cause or intensify fire; oxidizer
 H280 - Contains gas under pressure; may explode if heated
 H315 - Causes skin irritation
 H319 - Causes serious eye irritation
 H330 - Fatal if inhaled
 H335 - May cause respiratory irritation

Precautionary statements (GHS-US) :

P220 - Keep/Store away from clothing, combustible materials
 P244 - Keep reduction valves/valves and fittings free from oil and grease
 P260 - Do not breathe gas

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P264 - Wash hands, forearms and face thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear eye protection, face protection, protective clothing, protective gloves
P284 - Wear respiratory protection
P302+P352 - If on skin: Wash with plenty of soap and water
P304+P340 - If inhaled: Remove person to fresh air and keep 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 doctor
P321 - Specific treatment (see supplemental first aid instruction on this label)
P332+P313 - If skin irritation occurs: Get medical advice/attention
P337+P313 - If eye irritation persists: Get medical advice/attention
P362+P364 - Take off contaminated clothing and wash it before reuse
P370+P376 - In case of fire: stop leak if safe to do so
P403 - Store in a well-ventilated place
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P410+P403 - Protect from sunlight. Store in a well-ventilated place
P501 - Dispose of contents/container to a hazardous or special waste collection point

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	GHS-US classification
Chlorine (Main constituent)	(CAS No) 7782-50-5	100	Ox. Gas 1, H270 Press. Gas Liq., H280 Acute Tox. 2 (Inhalation:gas), H330 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335

Full text of H-statements: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Move the affected person away from the contaminated area and into the fresh air. Remove contaminated clothing. Provide oxygen and/or ventilation assistance, if needed. Call a physician immediately. Transport to hospital immediately. Keep victim warm and rested. Delayed adverse effects possible.

First-aid measures after skin contact : Immediately remove contaminated clothing or footwear. Rinse immediately with plenty of water. If necessary seek medical advice.

First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Consult an eye specialist immediately.

First-aid measures after ingestion : Not specifically applicable.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Exceeding the exposure limits atmospheric concentrations may lead to immediate and severe irritation of the upper respiratory tract, severe coughing, choking and bronchospasm (15-20 ppm), shortness of breath, chest pain, nausea and vomiting (30 ppm). There are indications that some exposures may cause bronchial hyperactivity in some sensitive individuals. Fainting and death may occur after exposure above 50 ppm (depending on the duration of exposure). Chemical tracheobronchitis, pulmonary edema may occur up to 48 hours after exposure (above 40 ppm).

Symptoms/injuries after skin contact : Causes skin irritation.

Symptoms/injuries after eye contact : Causes serious eye irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

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SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : All extinguishing agents can be used. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : May intensify fire; oxidiser.
Reactivity : Oxidizing. Contact with combustible material may cause fire.

5.3. Advice for firefighters

Firefighting instructions : Clear the danger area. Combat the gas with a water-spray. Contain the extinguishing fluids by bunding (the product is hazardous for the environment). Use water spray or fog for cooling exposed containers. If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire. Keep upwind.
Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation. Do not breathe vapours. Avoid any direct contact with the product. Access forbidden to unauthorised personnel.

6.1.1. For non-emergency personnel

Emergency procedures : Mark out the contaminated area with signs and prevent access to unauthorized personnel. Consult an expert immediately. Avoid any direct contact with the product. Do not breathe vapours. Prevent wind dispersal. Keep upwind.

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Stop leak if safe to do so. Use water curtains to contain the toxic clouds. Contain the spilled material by bunding. Turn leaking containers leak-side up to prevent the escape of liquid. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Combat the gas with a water-spray. Suck towards a neutralization installation. Wash with sodium carbonate solution (5% Na₂CO₃).

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Ensure good ventilation of the work station. Avoid any direct contact with the product. Smoking is forbidden. Avoid contact of substance with water. Do not breathe gas. Closed system. Vapour extraction at source. Only oil the equipment with specialist greases (chlorofluorinated).
Hygiene measures : Do not drink, eat or smoke in the workplace. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : The floor of the depot should be impermeable and designed to form a water-tight basin. Storage areas must be equipped with a high and low ventilation and connected to a neutralization / absorption unit.
Storage conditions : Keep container tightly closed and dry. Store in a cool, well-ventilated place. Protect from sunlight. Keep away from heat. Keep at temperature not exceeding 50 °C.
Incompatible materials : Combustible materials. reducing materials. Organic materials. Finely divided metals (Al, Mg, Zn). Hydrogen. Acetylene. Ethylene. ethane. Hydrazine. Phosphorus. Arsenic. antimony. Fats. Silicons. (Risk of violent reaction -. Ignition).
Storage temperature : < 50 °C
Packaging materials : Recommended materials : Ordinary steel. Polytetrafluoroethylene (PTFE). PVC. Packing material to avoid : metals. Titanium. Aluminium. Some plastics.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Chlorine (7782-50-5)		
ACGIH	ACGIH TWA (mg/m ³)	1.5 mg/m ³
ACGIH	ACGIH TWA (ppm)	0.50 ppm
ACGIH	ACGIH STEL (mg/m ³)	2.9 mg/m ³
ACGIH	ACGIH STEL (ppm)	1 ppm
ACGIH	Remark (ACGIH)	URT & eye irr
OSHA	OSHA PEL (Ceiling) (mg/m ³)	3 mg/m ³
OSHA	OSHA PEL (Ceiling) (ppm)	1 ppm

8.2. Exposure controls

Appropriate engineering controls	: Ensure good ventilation of the work station. Extraction to remove vapours at their source. Safety shower. Eye fountain. Monitor the atmosphere at regular intervals.
Hand protection	: Neoprene protective gloves. Breakthrough time : refer to the recommendations of the supplier. The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN 374.
Eye protection	: Safety glasses. Face-shield.
Skin and body protection	: Protective clothing.
Respiratory protection	: Gas mask with filter type B.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Colour	: Slightly yellow to green
Odour	: Pungent
Odour threshold	: 0.3 - 0.5 ppm
pH	: Not applicable
Melting point	: -101 °C
Freezing point	: No data available
Boiling point	: -34 °C
Flash point	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: No data available
Explosive limits	: Not applicable
Explosive properties	: Not explosive.
Oxidising properties	: Oxidizing.
Vapour pressure	: 6780 hPa (20 °C)
Relative density	: 2.49
Relative vapour density at 20 °C	: No data available
Density	: 1.411 g/cm ³
Solubility	: Benzene : 318 g/kg (20 °C). Acetic acid : 121 g/kg (15 °C). Tetrachloromethane : 114 g/kg (20 °C). Water: 7.41 g/l (20 °C)
Log Pow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: 0.0134 mPa.s (20 °C)

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9.2. Other information

No additional information

SECTION 10: Stability and reactivity

10.1. Reactivity

Oxidizing. Contact with combustible material may cause fire.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

Explosive when mixed with : Hydrogen. Ammonia. Organic materials. Attacks many metals in the presence of water or humidity. Reacts violently with unsaturated organic compounds, alcohols, ethers, fats, mineral oils (including silicones), phosphorus, arsenic, antimony, aluminum, finely divided metals. Dry chlorine reacts violently with titanium.

10.4. Conditions to avoid

Moisture.

10.5. Incompatible materials

reducing materials. Combustible materials. Powdered metals. Acetylene. Hydrogen. Organic materials. Ammonia. Various hydrocarbon fragments. Water. Hydrazine. Fats. Silicones. Iron (>100 °C).

10.6. Hazardous decomposition products

On contact with water : Hydrochloric acid. Hypochlorous acid.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:gas: Fatal if inhaled.

Chlorine (7782-50-5)	
LD50 oral rat	1100 mg/kg (OECD 401) (Read across)
LD50 dermal rabbit	> 20000 mg/kg (OECD 402) (Read across)
LC50 inhalation rat	1321 mg/m ³ (60 minutes) (equivalent or similar to OECD Guideline 403)
ATE US (oral)	1100.000 mg/kg bodyweight
ATE US (gases)	100.000 ppmv/4h

Skin corrosion/irritation : Causes skin irritation.

pH: Not applicable

Serious eye damage/irritation : Causes serious eye irritation.

pH: Not applicable

Respiratory or skin sensitisation : Not classified

(Based on available data, the classification criteria are not met)

Germ cell mutagenicity : Not classified

(Based on available data, the classification criteria are not met) Mutagenicity : Ames test : negative (OECD 471) (read-across)

Carcinogenicity : Not classified

(Based on available data, the classification criteria are not met)

Reproductive toxicity : Not classified

(Based on available data, the classification criteria are not met) No observed effects NOAEL (oral, rat) : > 5 mg/kg/d (OECD 415 method)

Specific target organ toxicity (single exposure) : May cause respiratory irritation.

Specific target organ toxicity (repeated exposure) : Not classified

(Based on available data, the classification criteria are not met)

Chlorine (7782-50-5)	
LOAEL (oral, rat, 90 days)	20 mg/kg bodyweight/day (OECD 408) (Read across)
NOAEL (oral, rat, 90 days)	20 mg/kg bodyweight/day (OECD 408) (Read across)

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Aspiration hazard	: Not classified (Not applicable)
Symptoms/injuries after inhalation	: Exceeding the exposure limits atmospheric concentrations may lead to immediate and severe irritation of the upper respiratory tract, severe coughing, choking and bronchospasm (15-20 ppm), shortness of breath, chest pain, nausea and vomiting (30 ppm). There are indications that some exposures may cause bronchial hyperactivity in some sensitive individuals. Fainting and death may occur after exposure above 50 ppm (depending on the duration of exposure). Chemical tracheobronchitis, pulmonary edema may occur up to 48 hours after exposure (above 40 ppm).
Symptoms/injuries after skin contact	: Causes skin irritation.
Symptoms/injuries after eye contact	: Causes serious eye irritation.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Very toxic to aquatic life with long lasting effects.

Chlorine (7782-50-5)	
LC50 fish	0.06 mg/l/96h (<i>Salmo gairdneri</i>) (Read across)
EC50 Daphnia	0.141 mg/l/48h (<i>Daphnia magna</i>) (Read across)
ErC50 (algae)	< 0.05 mg/l/48h (<i>Arcatia</i>) (Read across)
ErC50 (other aquatic plants)	0.1 - 0.4 mg/l (<i>Myriophyllum spicatum</i>)
NOEC chronic fish	0.04 mg/l (<i>Menidia peninsulae</i>) (Read across)
NOEC chronic crustacea	0.01 mg/l (<i>E. capsaeformis</i>) (Read across)
Additional ecotoxicological information	Activated sludge : EC50 > 3 mg/l (3h)

12.2. Persistence and degradability

Chlorine (7782-50-5)	
Persistence and degradability	hydrolysis: In water, formation of hypochlorous acid and hypochlorites according to the environmental pH. Photodegradation in air: In the atmosphere, chlorine deteriorates during the day with half-lives ranging from a few minutes to a few hours depending on latitude, season and time of the day Photodegradation in water: Chlorine sensitivity to light is high. The half-life varies between 12 min at pH 8 and 60 min at pH 5 Photodegradation in soil: No data available.

12.3. Bioaccumulative potential

Chlorine (7782-50-5)	
Bioaccumulative potential	Not bioaccumulation due to its water solubility and its high reactivity.

12.4. Mobility in soil

Chlorine (7782-50-5)	
Ecology - soil	Very volatile. easily degradable in the soil.

12.5. Other adverse effects

Other adverse effects : No additional information available. In general, chlorine is known for its toxic effects on living organisms.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Vacuum to a soda neutralization system. Clean contaminated packagings with a solution of sodium carbonate . After cleaning, recycle or dispose of at an authorised site.

Additional information : The user's attention is drawn to the possible existence of specific european, national or local regulations regarding disposal.

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SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1017 Chlorine, 2.3

UN-No.(DOT) : UN1017

Proper Shipping Name (DOT) : Chlorine

Class (DOT) : 2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115

Subsidiary risk (DOT) : 5.1 - Class 5.1 - Oxidizer 49 CFR 173.128,8 - Class 8 - Corrosive material 49 CFR 173.136

Hazard labels (DOT) : 2.3 - Poison gas
5.1 - Oxidiser
8 - Corrosive



Marine pollutant : Yes (IMDG only)

DOT Packaging Non Bulk (49 CFR 173.xxx) : 304

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

DOT Special Provisions (49 CFR 172.102) : 2 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone B (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter
B9 - Bottom outlets are not authorized
B14 - Each bulk packaging, except a tank car or a multi-unit-tank car tank, must be insulated with an insulating material so that the overall thermal conductance at 15.5 C (60 F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials must not promote corrosion to steel when wet
N86 - UN pressure receptacles made of aluminum alloy are not authorized
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter
TP19 - The calculated wall thickness must be increased by 3 mm at the time of construction. Wall thickness must be verified ultrasonically at intervals midway between periodic hydraulic tests (every 2.5 years). The portable tank must not be used if the wall thickness is less than that prescribed by the applicable T code in Column (7) of the Table for this material

DOT Packaging Exceptions (49 CFR 173.xxx) : None

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : Forbidden

DOT Vessel Stowage Location : D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters",51 - Stow "separated from" acetylene,55 - Stow "separated from" ammonia,62 - Stow "separated from" diborane,68 - Stow "separated from" hydrogen,89 - Segregation same as for oxidizers,90 - Stow "separated from" radioactive materials

Emergency Response Guide (ERG) Number : 124

Other information : Dangerous for the environment.



TDG

Transport document description : UN1017 CHLORINE, 2.3

UN-No. (ADR/RID) (TDG) : UN1017

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TDG Proper Shipping Name	: CHLORINE
TDG Primary Hazard Classes	: 2.3 - Class 2.3 - Toxic Gas.
TDG Subsidiary Classes	: 5.1;8
TDG Special Provisions	: 23 - 1) A consignor of these dangerous goods must include on a shipping document, after the classification of the dangerous goods, the words "toxic by inhalation" or "toxic – inhalation hazard" or "toxique par inhalation" or "toxicité par inhalation" if the dangerous goods meet the criteria for inclusion in Class 6.1, Packing Group I, due to inhalation toxicity. For example: CYANIDE SOLUTION, N.O.S., Class 6.1, UN1935, PG I, toxic by inhalation 2) A person must not handle, offer for transport or transport these dangerous goods by passenger carrying road vehicle, passenger carrying railway vehicle or passenger carrying ship if they meet the criteria for inclusion in Class 6.1, Packing Group I, due to inhalation toxicity. 3) This special provision does not apply to a person who transports these dangerous goods in accordance with the exemption in section 1.15 of Part 1, Coming Into Force, Repeal, Interpretation, General Provisions and Special Cases
ERAP Index	: 500
Explosive Limit and Limited Quantity Index	: 0
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	: Forbidden
Passenger Carrying Ship Index	: Forbidden

Transport by sea

UN-No. (IMDG)	: 1017
Proper Shipping Name (IMDG)	: CHLORINE
Class (IMDG)	: 2 - Gases
MFAG-No	: 124

Air transport

UN-No. (IATA)	: 1017
Proper Shipping Name (IATA)	: Chlorine
Class (IATA)	: 2

SECTION 15: Regulatory information

15.1. US Federal regulations

Chlorine (7782-50-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	10 lb
SARA Section 302 Threshold Planning Quantity (TPQ)	100 lb

15.2. International regulations

CANADA

Chlorine (7782-50-5)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

No additional information available

15.3. US State regulations

Chlorine (7782-50-5)	
U.S. - California - Proposition 65 - Other information	This substance is not known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Data sources	: EPA (Environmental Protection Agency). NIOSH (National Institute for Occupational Safety and Health).
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Other information

: Safety data sheet established by : LISAM SERVICES - TELEGIS
17, Rue de la Couture F-60400 PASSEL
Safety Made Easy with www.lisam.com.

Full text of H-statements:

H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated
H315	Causes skin irritation
H319	Causes serious eye irritation
H330	Fatal if inhaled
H335	May cause respiratory irritation

SDS US (GHS HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product