









<p>  Health 4- Can be lethal.  Flammability 0 -Will not burn under typical fire conditions.  Instability 0 Normally stable, even under fire conditions.  Special OX oxidizing Do not use water on cylinders in case of emergency spillages </p>	<p> The Travancore Cochin Chemicals Ltd P.B.No;4,Udyogmandal.P.O Aluva. Ernakulam(dt) Kerala Phn:04842545011,mob .7736045000 Emergency contact no: 1800-11-1735 (Toll free 24 hrs) </p>
<p> NFPA  </p>	<p> Placard    </p>
<p align="center">MSDS-CHLORINE</p>	
<p> Document reference no: TCC/MSDS/CHLORINE/2015 Revision:1.2 Rev. date:01.01.2015 </p>	
<p>1.Potential Health Effects</p>	
<p>Primary route of entry</p>	<p>: inhalation, ingestion, eye/skin absorption</p>
<p>Aggravated medical condition</p>	<p>: Asthma , respiratory disorders</p>
<p> Inhalation: Inhalation of vapors is irritating to the respiratory system may cause throat pain and cough. Inhaled toxic substances can cause toxic edema of the lungs. Higher exposure may cause circulatory collapse and unconsciousness. There is no evidence that acute inhalation of chlorine at low to moderate levels will cause permanent lung damage. At high levels, chlorine is corrosive to the respiratory tract and may cause lung damage. </p>	

Skin: May cause skin irritation and/or dermatitis. Contact with liquid chlorine may cause burns with prolonged contact causing destruction of the dermis with impairment of the skin at site of contact to regenerate.

Eyes: Causes serious eye irritation. Blurred vision May cause permanent eye injury

Ingestion: Ingestion or inhalation of high concentrations may cause injuries to gastrointestinal tract, liver, kidneys and central nervous system. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Ingestion is not an applicable route of exposure for gases

Chronic Exposure :Effects from chronic skin exposure would be similar to those from single exposure except for effects secondary to tissue destruction

2.First aid measures

- **GENERAL INFORMATION:** Initial treatment is primarily supportive. There is no post-exposure therapy specifically for chlorine inhalation.
- **ANTIDOTE:** There is no antidote for chlorine toxicity

Eye contact

- IMMEDIATELY flush eyes with plenty of water holding eyelids apart for at least 15-20 minutes
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Get medical attention IMMEDIATELY

Skin contact

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a doctor for treatment advice

Ingestion

- Call a doctor immediately for treatment advice.
- Have person sip a glass of water if able to swallow.
- Do not induce vomiting unless told to do so by the poison control center or doctor.
- Do not give anything by mouth to an unconscious person.

Inhalation

- Move person to fresh air.

- If person is not breathing, call ambulance, and then give artificial respiration.
- Call a physician IMMEDIATELY

General advice

- Have the product container or label with you when calling a doctor or going for treatment.
- Show this safety data sheet to the doctor in attendance

3. Fire and Explosion Data

Flammable properties

Flash point -not applicable

Lower explosion limit -not applicable

Upper explosion limit -not applicable

Fire fighting

Suitable extinguishing media

- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

- Direct water spray
- Direct water spray jet

Further information :

- Contact with reactive metals e.g., aluminum, zinc and tin may result in the generation of flammable hydrogen gas.
- Cool containers / tanks with water spray.
- Water spray on active leak may promote accelerated corrosion of container and accelerate rate of leakage

Protective equipment and precautions for fire-fighters

Specific hazards during fire fighting

- Corrosive
- compressed liquefied gas

- toxic

Special protective equipment for fire-fighters

- Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to: boots gloves, hard hat, splash-proof goggles, full face shield and impervious clothing, i.e. chemically impermeable suit.
- Compatible materials for response to this material are neoprene and butyl rubber.
- For response to Chlorine gas it is recommended to use as a minimum level "B " protection that is compatible to Chlorine.
- For Liquid spills it is recommended to utilize as a minimum enhanced level "B" (Enhanced Level "B" is the addition of a splash hood).

5. Accidental Release Measures

In case of spillage or release

Restrict access to affected area.

Use personal protective equipment.

Use approved respiratory protection.

Keep people away from and upwind of spill/leak.

Vapors can accumulate in low areas

In the case of hazardous fumes, wear self contained breathing apparatus

Do not allow material to contaminate ground water system.

Try to prevent the material from entering drains or water courses.

Prevent further leakage or spillage if safe to do so.

Inform the responsible authorities in case of gas leakage, or of entry into waterways, soil or drains.

The liquid form is heavier than water. (Will form hazardous reaction products)

Pay attention to the spreading of gases especially at ground level (heavier than air) and to the direction of the wind.

Retain and dispose of contaminated wash water.

Additional advice

- Dispose of as hazardous waste in compliance with local, state and national regulations.
- You are requested to contact the emergency numbers before beginning any such operation

6-Decontamination

- **INTRODUCTION:** The purpose of decontamination is to make an individual and/or their equipment safe by physically removing toxic substances quickly and effectively. Care should be taken during decontamination, because absorbed agent can be released from clothing and skin as a gas.
- **INDIVIDUAL DECONTAMINATION:** The following methods can be used to decontaminate an individual:
 - Decontamination of First Responder:
 - Begin washing PPE of the first responder using soap and water solution and a soft brush. Always move in a downward motion (from head to toe). Make sure to get into all areas, especially folds in the clothing. Wash and rinse (using cold or warm water) until the contaminant is thoroughly removed.
 - Remove PPE by rolling downward (from head to toe) and avoid pulling PPE off over the head. Remove the SCBA after other PPE has been removed.
 - Place all PPE in labeled durable 6-mil polyethylene bags.
 - Decontamination of Patient/Victim:
 - Remove the patient/victim from the contaminated area.
 - Remove all clothing (at least down to their undergarments) and place the clothing in a labeled durable 6-mil polyethylene bag.
 - Thoroughly wash and rinse (using cold or warm water) the contaminated skin of the patient/victim using a soap and water solution. Be careful not to break the patient/victim's skin during the decontamination process, and cover all open wounds.
 - Cover the patient/victim to prevent shock and loss of body heat.
 - Move the patient/victim to an area where emergency medical treatment can be provided.

7.Handling and Storage

Handling : Personnel working with this chemical should be trained on its hazards.

Avoid inhalation, ingestion and contact with skin and eyes.

Storage: Requirements for storage areas and containers -Keep in a dry, cool and well-ventilated place. Store at temperatures not exceeding - 55 °C (131 °F)

8. Exposure Controls/Personal Protection

CAS-No. - 7782-50-5

TWA- 0.5 ppm (1.5 mg/m³)

STEL -1 ppm (2.9 mg/m³)

Engineering measures : Use local exhaust ventilation to maintain levels to below the PEL

Personal protective equipment

Eye protection :Ensure that eyewash stations and safety showers are close to the workstation location

Skin and body protection: Wear as appropriate: Full protective suit. Hard hat with brim Boots. Wear protective gloves and eye/face protection. Refer to Chlorine Institute Pamphlet #65 for specific personal protection equipment requirements

Respiratory protection: When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Wear NIOSH approved full-face respirator equipped with chemical cartridges for chlorine gas

Hygiene measures :General industrial hygiene practice

Suitable material

Boots. : • Neoprene • butyl-rubber

Gloves: • Neoprene • butyl-rubber

Protective suit: • Chemical Resistant Suit

*The listed materials are guidelines only and there are numerous PPE alternatives depending on the site specifics of where the chemical is used.

9.Physical and Chemical Properties

Appearance

Form :compressed liquefied gas

Color :yellow green

Odor :pungent

Flash point : not applicable

Lower explosion limit :not applicable

Upper explosion limit : not applicable

Oxidizing properties : yes

Auto ignition temperature : not applicable

Molecular Weight : 71 g/mol

pH : not applicable

Melting point/range : -150 °F (-101 °C) at 760 mmHg

Boiling point/boiling range : -29 °F (-34 °C) at 760 mmHg

Vapor. pressure : 779 kPa at 77 °F (25 °C) ,4,800 mmHg at 77 °F (25 °C) ,113 psia at 77 °F (25 °C)

Density : 0.7632 lb/ft³ at 32 °F (0 °C) 53.51 psia

Bulk density : 88.76 lb/ft³ at 59.8 °F (15.6 °C)

Water solubility : Chlorine is only slightly soluble in water, with its maximum solubility occurring at 10°C F. After that, its solubility decreases until 100° C. At temperatures below that range, it forms crystalline hydrates (usually Cl₂) and becomes insoluble. Between that range, it usually forms hypochlorous acid (HOCl) which is highly corrosive.

Specific gravity : not applicable

10. Stability and Reactivity Data

Conditions to avoid :

- Titanium will react vigorously, resulting in spontaneous ignition, when contacted by Dry Chlorine.

<ul style="list-style-type: none"> • Combustion will be supported in carbon steel systems and equipment containing a Chlorine environment at temperatures greater than 480 °F. • Properly purge systems and equipment PRIOR to conducting Hot Work. <p>Materials to avoid :</p> <ul style="list-style-type: none"> • Reducing agents, Organic materials, Alkalis <p>Hazardous decomposition product: hydrogen chloride ,hypochlorous acid</p> <p>Thermal decomposition : Stable under normal conditions</p>
11. Toxicological Information
<p>Odor threshold : approximately 1.7 mg/m³ (0.3 ppm)</p> <p>Irritation Threshold : approximately 0.5 ppm</p> <p>Immediately Dangerous to Life or Health : 10 ppm</p>
12. Ecological Information
Ecotoxicity: potential hazard to plant and marine life. Marine pollutant
13. Disposal Considerations
Waste Classification : If this product becomes a waste, it meets the criteria of a hazardous waste
14. Transport Information
<p>DOT</p> <p>Proper shipping name : Chlorine</p> <p>UN-Number : UN1017</p> <p>Class : 2.3</p> <p>Hazard Labels/Placard : 2.3 (8, 5.1)</p> <p>IATA</p> <p>UN-Number : UN1017</p> <p>Class : 2.3 Not permitted for transport</p>

15. Regulatory and other Information

Permitted level (threshold)in work place <1ppm
STEL <3ppm

OSHA Hazards : Corrosive, Toxic by inhalation., Compressed Gas, Oxidizer

*THE INFORMATION CONTAINED HEREIN IS PRESENTED IN GOOD FAITH
AND BELIEVED TO BE CORRECT AS OF THE DATE ISSUED*