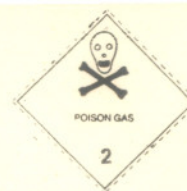


MATERIAL SAFETY DATA SHEET

**SECTION I : MATERIAL IDENTIFICATION & USE :** CHLORINE, used in bleaching Powder, water treatment.

**Material - Name/Identifier :** CHLORINE/GREENISH YELLOW (GAS) & CLEAR AMBER (LIQUID)



<b>Manufacturer's Name</b>	CENTURY CHEMICALS	<b>Manufacturer's Name</b>	CENTURY CHEMICALS
<b>Street Address</b>	MURBAD ROAD	<b>Street Address</b>	MURBAD ROAD
<b>City</b>	KALYAN Dist Thane	<b>City</b>	KALYAN Dist Thane
<b>State</b>	MAHARASHTRA	<b>State</b>	MAHARASHTRA
<b>Postal Code</b>	421 103	<b>Postal Code</b>	421 103
<b>Emergency Tel No</b>	0251-2733670-79 Ulhasnagar	<b>Emergency Tel No</b>	0251-2733670-79 Ulhasnagar

<b>Chemical Name</b>	CHLORINE	<b>Chemical Identity</b>	Gas & Liquid
<b>Trade Name &amp; Synonyms</b>	LIQUID CHLORINE	<b>PRODUCT Use</b>	Bleaching, water Treatment & Chlorides

**SECTION II : HAZARDOUS INGREDIENTS OF MATERIAL**

Hazardous Ingredients	Approximate Conc - %	CAS or UN Number	LD50 (Specify Species & Route)	LC50 (Specify Species & Routes)
CHLORINE GAS & LIQUID.	0.2 to 1000 ppm in air	UN Number 1017	100 ppm	Inhalation, Ingestion skin absorption

**SECTION III : PHYSICAL DATA FOR MATERIAL**

<b>Physical State</b> Gas/Liquid/Solid	<b>Odour &amp; Appearance</b>	<b>Odour threshold (ppm)</b>
<b>Gas &amp; Liquid under Pressure</b>	Pungent & suffocating	1 ppm = 3 mg/m <sup>3</sup>
<b>Specific Gravity</b> Water = 1 1.4 at 20°C	<b>Vapour pressure (mm)</b> 6.3 kg/m at 20°C	<b>Vapour density (Air - 1)</b> 2.49 at 20°C and 4800 mm mercury
<b>Evaporation Rate</b> -	<b>Boiling Point (°C)</b> -34.5°C	<b>Freezing Point (°C)</b> -
<b>Solubility in Water (20°C)</b> Slightly soluble	<b>PH</b> Nil	<b>Density (g/ml)</b> -
<b>Coefficient of water/oil distribution</b>	<b>Melting Point</b> -101°C	<b>Molecular Wt : 70.914</b>



## SECTION IV : FIRE AND EXPLOSION HAZARD OF MATERIAL

Flammability - Yes/No NO	Means of Extinction Not applicable	Special Procedures -
Flash Point (°C) and method : NIL	Upper Explosive limit (% by vol) : NIL	Lower Explosive limit (% by vol) : NIL
Auto-ignition temp (°C)	TDG flammability Class 2	Hazardous combustion Product. Halides of organic chemicals
Explosion data - sensitivity to chemical impact  Sensitivity to hydrogen and organic chemicals.		Sensitivity to static discharge

## SECTION V : REACTIVITY DATA

Chemical Stability Yes/No - If No under what condition	Yes
Incompatibility with other substances - Yes/No. If yes, which ones	With hydrogen gas, it reacts explosively. With nitrogen it forms nitrogen trichloride
Reactivity under what conditions	Has affinity for hydrogen. With water it gives corrosive solutions. HCL and HOCL. With caustic soda and lime it forms bleaching powder
Hazardous decomposition Products	Evolution of chlorine
Material - Name/Identifier	Chlorine/Greenish yellow gas. Amber colour liquid.

## SECTION VI : TOXICOLOGICAL PROPERTIES OF MATERIAL (route of entry)

Skin contact Burning sensation	Skin absorption Chemical burns	Eye contact Irritation - wash with plenty of water for 15-20 minutes.
Inhalation acute Pulmonary oedema	Inhalation chronic Damage to mucous membrane nose, throat.	Ingestion Vomitting, nausea



EFFECTS OF ACUTE EXPOSURE TO MATERIAL

0.2 - 0.5 ppm	No long term effect
0.5 ppm	Slight odour
1.0 - 3.0 ppm	Definite odour. Eyes nose irritation
6.0 ppm	Irritation to throat
30 ppm	Intense cough, fits
40 - 60 ppm	Effects respiratory damage
100 ppm	Lethal dose
1000 ppm	Danger to life

Effects of Chronic exposure to material	Exposure limit (s)	Irritancy of material
Suffers from "ACNE" tooth enamel damage tuberculosis, damage to pulmonary function	<div>1 ppm</div> <div>3 mg/m<sup>3</sup></div> <div>3 ppm</div> <div>9 mg/m<sup>3</sup></div> <div>(TWA)</div> <div>STEL</div>	Causes damage to mucous membrane

SENSITIZATION TO MATERIAL : (Carcinogenically, Reproductive Effects, Tetratogenically Mutagenicity)

Tuberculosis of LUNGS

SYNERGISTIC MATERIALS : When inhaled in small quantities, it affects mucous membrane, causes cough. In large quantity exposure, pulmonary oedema is caused.

SECTION VII : PREVENTIVE MEASURES

- 1 Leakages to be detected with liquid gas ammonia - it gives white cloud.
- 2 Handling of chlorine should be done by Pipelines
- 3 In emergency of chlorine gas leakage, use gas mask, evacuate the area
- 4 Spillage should be contained by making bunds of sand, absorb chlorine in alkaline solution such as caustic soda, soda ash or lime
- 5 Pin hole damages in the tonners/cylinders to be blocked by driving hard wood plug or metal pin
- 6 Do not expose cylinders to direct sunlight and avoid exposure to heat source. Temperature over 70°C is likely to result in inside pressure building up to dangerous proportions and create damage/explosion
- 7 If cutting or welding operation is to be undertaken on cylinders or pipeline, it is necessary to ensure complete purging of chlorine, as iron/steel will ignite in chlorine at about 480°F (250°C)

PERSONAL PROTECTIVE EQUIPMENT

Gloves (Specify)	Rubber or PVC
Respiratory (Specify)	Gas mask, oxygen cylinder supply with gas mask, self contained breathing apparatus
Eyes (Specify)	Face shield of acrylic
Footwear (Specify)	Gumboots, rubber or PVC
Clothing (Specify)	Apron PVC or rubber, overall PVC suit with hood
Other (Specify)	-



ENGG CONTROL (e.g., Ventilation, enclosed process etc) Pls. Specify

<u>Leak &amp; Spill Proceufures</u> Leak detection by Ammonia gas forming white cloud. Spillage to be contained by bunds of sand, absorb chlorine in alkaline solution such as caustic soda or lime or soda ash.	<u>Waste Disposal</u>
<u>Handling Procedure &amp; Equipment</u> Handling through Pipelines, cylinders and tonners under pressure	<u>Storage Requirements</u> Storage area to be cool, dry, well ventilated, clean of trash and protected from external heat sources. Storage should be on ground floor.

#### Special Shipping Information

Class 2 - gases compresed, liquieed, dissoived under pressure or deeply rerregerated.  
 Symbol : Non flammable gases (Symbol - 1) Gas cylinder, black or white, background - green. (2) Poison (Toxic gases) Symbol (skull & cross bones) Black background : White.

X = Full breathing apparatus, E = Consider Evacuation. HAZCHEM symbol : 2 XE

#### SECTION VIII : FIRST AID MEASURES

- 1 Trained personnel
- 2 Oxygen administration apparatus to be available
- 3 Emergency showers and eye fountains
- 4 Remove affected persons to uncontaminated area, wash affected parts of the body with plenty of water
- 5 Skin Contact :- Wash affected area with large quantity of water for 15 minutes
- 6 Eyes - If eyes are affected with liquid chlorine or high concentration of chlorine gas, it should be flushed with running water for 15 minutes.
- 7 Inhalation : If unconscious, lay on his back and head elevated, loosen tight clothes, keep warm by using blankets, stimulate the body with coffee, tea etc. If unconscious, but breathing, give him oxygen at low pressure till Doctor arrives. If breathing has stopped, give him artificial respiration. Person giving artificial respiration should be well trained.

#### SOURCES USED

- 1 National Safety Council - Chemical Safe Practice Pamphlet SPP-1
- 2 IA 4263-1967 - Code of Safety for chlorine.

#### ADDITIONAL INFORMATION

Persons exposed to chlorine should be medically examined atleast every six months. Victims suspected to infections of the air passages, lung disease, heart disorders should not be employed in this area.

#### SECTION IX : DATE OF PREPARATION OF MATERIAL SAFETY DATA SHEET

0251-2733670-79

Prepared by Safety Deptt. of Century Rayon,

Ulhasnagar

NOTES : (1) CAS or UN Number - Chemical Abstract Service or United Nations (UN) Number (2) LD 50 - Lethal Dose 50 (LD50 - Specify species & route), (3) LC50 Lethal concentration 50% (LC50 - Specify species & route), (4) TGD flammability Transport of Dangerous Goods Flammability Classification by United Nations.