

Chlorine

Cl₂

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Name of product	Chlorine
	Art-Nr(n): 0300 - 0304, 0320 - 0343
Name of substance	Chlorine
Index No	017-001-00-7
EC No	231-959-5
REACH registration number	01-2119486560-35
CAS No	7782-50-5

Manufacturer / Distributor:

Ehsan International Gases

40/9, Aurangabad, Nazimabad
#3, Karachi 74600, Pakistan.
+92 21 36612091 – 36612907

info@ehsan.com.pk

www.ehsan.com.pk

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

Identified uses

Sector of uses [SU]

- SU13 - Manufacture of other non-metallic mineral products, e.g. plasters, cement
- SU14 - Manufacture of basic metals, including alloys
- SU16 - Manufacture of computer, electronic and optical products, electrical equipment
- SU5 - Manufacture of textiles, leather, fur
- SU6b - Manufacture of pulp, paper and paper products
- SU8 - Manufacture of bulk, large scale chemicals (including petroleum products)
- SU9 - Manufacture of fine chemicals

Process categories [PROC]

- PROC1 - Use in closed process, no likelihood of exposure
- PROC2 - Use in closed, continuous process with occasional controlled exposure
- PROC3 - Use in closed batch process (synthesis or formulation)
- PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
- PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
- PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at nondedicated facilities
- PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
- PROC13 - Treatment of articles by dipping and pouring

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PROC14 - production of preparations or articles by tableting, compression, extrusion, pelettisation PROC8b
- Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Environmental release categories [ERC]

ERC1 - Manufacture of substances

ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

ERC6b - Industrial use of reactive processing aids

Uses advised against

Remark Do not use for private purposes (household).

Recommended intended purpose(s)

Basic substance.

Biocidal product.

Oxidising agent.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to 67/548/EEC or 1999/45/EC

T; R23

Xi; R36/37/38

N; R50

R-phrases

23 Toxic by inhalation.

36/37/38 Irritating to eyes, respiratory system and skin. 50

Very toxic to aquatic organisms.

Additional hints

Listed substance (Regulation (EC) No 1272/2008, Annex VI, part 3).

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]

Hazard classes and Hazard	Hazard Statements	Classification procedure categories
Ox. Gas 1	H270 Liquef. Gas	H280
Acute Tox. 2		H330
Skin Irrit. 2		H315
Eye Irrit. 2	H319 STOT SE 3	H335
Aquatic Acute 1		H400
Aquatic Chronic 1		H410

On basis of test data.

Hazard statements for physical hazards

H270 May cause or intensify fire; oxidiser.

H280 Contains gas under pressure; may explode if heated.

Hazard statements for health hazards

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H330 Fatal if inhaled.

H335 May cause respiratory irritation.

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Hazard statements for environmental hazards

H400 Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

Additional hints

Listed substance (Regulation (EC) No 1272/2008, Annex VI, part 3).

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]



GHS03



GHS06



GHS09

Signal word

Danger

Hazard statements for physical hazards

H270 May cause or intensify fire; oxidiser.

H280 Contains gas under pressure; may explode if heated.

Hazard statements for health hazards

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H330 Fatal if inhaled.

H335 May cause respiratory irritation.

Hazard statements for environmental hazards

H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention

P244 Keep valves and fittings free from oil and grease.

P260 Do not breathe gas/vapours.

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

Response

P304 + P340 IF INHALED: Remove to fresh air and keep at rest in a position 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.

P315 Get immediate medical advice/attention.

P332 + P313 If skin irritation occurs: Get medical advice/attention.

Storage

P403 Store in a well-ventilated place.

P405 Store locked up.

Supplemental Hazard information (EU)

Health properties

Corrosive to the respiratory tract.

Special rules for supplemental label elements for certain mixtures

Restricted to professional users.

This product complies with EN 937.

Read attached instructions before use.

2.3. Other hazards

Information pertaining to special dangers for human and environment

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Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level. Contact with liquid may cause cold burns/frostbite.

Risk of skin resorption.

SECTION 3: Composition/ information on ingredients

3.1. Substances

CAS No 7782-50-5

Chlorine

EC No 231-959-5

Index No 017-001-00-7

REACH registration number 01-2119486560-35

3.2. Mixtures

not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

Remove contaminated soaked clothing immediately.

Adhere to personal protective measures when giving first aid.

Seek medical advice immediately.

In case of inhalation

Remove the casualty into fresh air and keep him immobile.

In the event of pulmonary irritation treat initially with corticoid spray, e.g. Ventolair- or Pulmicort- metered-dose aerosol (Ventolair and Pulmicort are registered trademarks).

In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

In case of skin contact

In case of contact with skin wash off immediately with plenty of water.

In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

In case of contact with skin wash off immediately and for a long time (at least 15 minutes) with plenty of water.

In case of eye contact

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Call for a doctor immediately.

In case of ingestion

Ingestion is not considered a potential route of exposure.

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

Physician's information / possible symptoms

Coughing

Shortness of breath.

Physician's information / possible dangers

Risk of pulmonary oedema

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

Treatment (Advice to doctor)

Continue to monitor for pneumonia and pulmonary oedema.

Monitor circulation.

Symptoms may not occur until several hours.

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SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Foam

Water spray jet

Unsuitable extinguishing media

Full water jet

5.2. Special hazards arising from the substance or mixture

The substance / product enhances the combustion.

5.3. Advice for firefighters

Special protective equipment for fire-fighters

Use breathing apparatus with independent air supply (isolated). Wear full protective clothing.

Additional information

Cool endangered containers with water spray jet.

Exposure to fire may cause containers to rupture / explode.

Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations. Collect contaminated firefighting water separately, must not be discharged into the drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

See chapter 8.

Remove persons to safety.

Evacuate area.

Keep people away and stay on the upwind side.

6.2. Environmental precautions

Do not discharge into the drains or bodies of water..

Collect contaminated water / firefighting water separately.

If possible, stop flow of product.

Prevent spread (e.g. by saving in a salvage packaging).

Suppress gases/vapours/mists with water spray jet Do

not discharge into the subsoil/soil.

6.3. Methods and material for containment and cleaning up

Ensure adequate air ventilation. **Additional Information** No water on the leaks.

6.4. Reference to other sections

Informations for safe handling see chapter 7.

Informations for personal protective equipment see chapter 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling

Use only in thoroughly ventilated areas.

Transfer and handle only in enclosed systems.

Provide good room ventilation even at ground level (vapours are heavier than air).

Prevent cylinders from falling over.

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Ensure valve outlet cap nut or plug is correctly fitted.
 Ensure valve protection device is correctly fitted.
 Open valve slowly to avoid pressure shock.
 Use only properly specified equipment which is suitable for this product, its supply pressure and temperature.
 Do not allow backfeed into the container.
 Suck back of water into the container must be prevented.
 Keep valves and fittings free from oil and grease.
 No water to valves, flanges and other fittings.
 Purging of pipes and valves with inert gases - to avoid: water, solvents.

General protective measures

Do not inhale gases/vapours/aerosols.

Hygiene measures

At work do not eat, drink, smoke or take drugs. Wash hands before breaks and after work.

Advice on protection against fire and explosion

The product is not combustible, but supports burning.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels Ventilate store-rooms thoroughly.

Use transportable pressure equipment.

Suitable materials: Normalised steel and carbon steel, tempered steel, stainless steel.

Valve: Suitable materials: Brass, copper alloys, carbon steels, stainless steel. Unsuitable materials: Aluminium alloys.

Advice on storage compatibility

Do not store with spontaneously flammable materials.
 Do not store together with combustible liquids or combustible solids.
 Do not store together with animal feedstuffs.
 Do not store together with explosives.
 Do not store together with infectious substances.
 Do not store together with radioactive material.
 Do not store together with toxic liquids or toxic solids.
 Do not store together with food.
 Do not store together with oxidizing liquids or oxidizing solids.

Further information on storage conditions

Ensure valve protection device is correctly fitted.
 Store closed container at cool and aired place.
 Store only in original container at temperature of 50°C maximum (=122°F).
 Prevent cylinders from falling over.
 Protect from heat/overheating.

Information on storage stability

Unlimited stability.

7.3. Specific end use(s)

Recommendation(s) for intended use

See exposure scenario(s).

Use as biocidal product in accordance with Directive 98/8/EC concerning the placing of biocidal products on the market.

Use as biocidal product: Disinfection of bathing and drinking water. Preservation of water or other liquids used in cooling and processing systems.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ingredients with occupational exposure limits to be monitored

CAS No	Name	Code	[mg/m ³]	[ppm]	Remark
7782-50-5	Chlorine	TLV, 8 hours	1.5	0.5	USA (ACGIH)
		Short-term	2.9	1	
7782-50-5	Chlorine	WEL, 8 hours	1.5	0.5	United Kingdom (EH 40)
		Short-term			
7782-50-5	Chlorine	REL, 8 hours	1.45	0.5	Ceil USA (NIOSH)
		Short-term			
7782-50-5	Chlorine	PEL, 8 hours	3	1	Ceil USA (OSHA)

Indicative occupational exposure limit values (91/322/EEC, 2000/39/EC, 2006/15/EC or 2009/161/EU)

CAS No	Name	Code	[mg/m ³]	[ppm]	Remark
7782-50-5	Chlorine	Short-term	1,5	0,5	

Additional advice

DNEL (workers, inhalation, long-term, systemic effects): 0,75 mg/m³ (0,255 ppm).
 DNEL (workers, inhalation, long-term, local effects): 0,75 mg/m³ (0,255 ppm).
 DNEL (workers, inhalation, acute, local effects): 1,5 mg/m³ (0,51 ppm).
 DNEL (workers, inhalation, acute, systemic effects): 1,5 mg/m³ (0,51 ppm).
 DNEL (consumers, inhalation, acute, local/systemic effects): 1,5 mg/m³ (0,51 ppm).
 DNEL (consumers, dermal, long-term, systemic effects): 0,5% Gew. (mixture).
 DNEL (consumers, inhalation, long-term, systemic effects): 0,75 mg/m³ (0,255 ppm).
 DNEL (consumers, ingestion, long-term, systemic effects): 0,25 mg/kg.
 DNEL (consumers, dermal, long-term, local effects): 0,5% Gew. (mixture).
 DNEL (consumers, inhalation, long-term, local effects): 0,75 mg/m³ (0,255 ppm).

8.2. Exposure controls

Respiratory protection

Breathing apparatus in the event of high concentrations.
 Keep self contained breathing apparatus readily available for emergency use.
 Short term: filter apparatus, filter B2.
 Short term: filter apparatus, combination filter B2-P2.

Hand protection chemical-

resistant gloves

Leather gloves

Glove material specification [make/type, thickness, permeation time/life]: FKM, >= 0,7 mm, > 480 min

Eye protection safety goggles, in case of increased risk add protective face shield

Skin protection

Safety shoes with steel toe.

Body covering work clothing, or chemical resistant suit at increased risk.

Limitation and surveillance of the environment

PNEC (freshwater): 0,00021 mg/l

PNEC (sea water): 0,000042 mg/l

PNEC (water): 0,00026 mg/l (intermittent emission).

PNEC (water): 0,03 mg/l (sewage treatment plant)

PNEC (soil): 11,1 mg/kg

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Additional advice on system design

Transfer and handle only in enclosed systems.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	Colour	Odour
compressed liquified gas	yellowy-green	pungent

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value in delivery state	1,8	20 °C	6,4 g/l		aqueous solution
Acid number	not applicable				
boiling point	-34,1 °C		1013 hPa		
melting point	-101 °C				
Flash point	no				
Flammable solid	not applicable				
Flammability (gas)	no				
Ignition temperature	no				
Autoignition	no				
Lower explosion limit	no				
Upper explosion limit	no				
Vapour pressure	6700 hPa	20 °C			
Relative density	1,563 g/cm ³	-34 °C			liquid phase
Bulk density	not applicable				
Vapour density	2,486				
Solubility in water	7,3 g/l	20 °C			
Viscosity dynamic	0,34 mPa*s	20 °C			
Solvent concentration	not applicable				

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Oxidising properties

Coefficient of oxygen equivalency Ci = 0,7 (ISO 10156)

Explosive properties

no

9.2. Other information

No information available.

SECTION 10: Stability and reactivity

10.1. Reactivity

See section "Possibility of hazardous reactions".

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May react violently with combustible materials.

May react violently with reducing agents.

Violently oxidises organic material.

With water causes rapid corrosion of some metals.

At high temperatures (> 120 °C) chlorine reacts spontaneously with iron (chlorine / iron fire).

May react with aluminium.

10.4. Conditions to avoid

Heat sources / heat - risk of bursting.

Humidity.

10.5. Incompatible materials

Materials to avoid

Metals in powder form.

Fine metal particles.

Reducing agents.

Organic substances (fats, oils).

Water / moisture.

Alkalis.

Aluminium / Aluminium alloys.

10.6. Hazardous decomposition products

When handled and stored appropriately, no dangerous decomposition products are known.

Additional information

Avoid accumulation of nitrogen trichloride.

Avoid accumulation of hydrogen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity/Irritability/Sensitization

	Value/Validation	Species	Method	Remark
LC50 acute inhalation	0,65 mg/l (4 h)	rat	OECD 403	

	Value/Validation	Species	Method	Remark
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Irritability skin	irritant	experiences
Irritability eye	irritant - risk of strong eye injuries	experiences
Skin sensitization	non-sensitizing	Guinea pig
Sensitization respiratory system	not determined	OECD 406

Subacute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Chronic Toxicity	NOAEL 0,5 ppm (90 d)	Rat	OECD 413	No systemic signs observed, irritation of the respiratory system.
	Inhalation			

Mutagenicity

Data insufficient.

Reproduction-Toxicity

Rat
OECD 415

No indications of toxic effects were observed in reproduction studies in animals.

Carcinogenicity

NOAEL
Rat
OECD 451
Oral.

No indications of carcinogenic effects are available from long-term trials.

Experiences made from practice

Risk of strong health injuries in case of long-term exposition.
Inhalation can cause damage to the respiratory tract or lungs.

SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicological effects

	Value	Species	Method	Validation
Fish	LC50 0,84 mg/l (1 h)	mosquito fish		
Daphnia	EC50 0,141 mg/l (48 h)	Daphnia magna		

12.2. Persistence and degradability

Physico-chemical

not determined

degradability

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Biological degradability

Inorganic product, cannot be eliminated from the water by biological purification processes.

Biological eliminability

Inorganic product, cannot be eliminated from the water by biological purification processes.

12.3. Bioaccumulative potential

Does not bioaccumulate.

12.4. Mobility in soil

Adsorption in the soil is not likely.

12.5. Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6. Other adverse effects

Behaviour in sewage plant

When discharged into biological sewage treatment plants, interference with the degradation activity of activated sludge is possible, depending on the local conditions and concentrations involved. Treat by state-of-the-art technology before discharging into drains.

Additional ecological information

	Value	Method	Remark
COD			not determined
BOD			not determined

General regulation

Do not allow uncontrolled leakage of product into the environment.

Product is not allowed to be discharged into the ground water or aquatic environment.

At concentration of 5 mg/l and up the product may decrease the efficiency of activated sludge and so causes a harmful effect in sewage treatment plants.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste code No.

16 05 04*

Name of waste

gases in pressure containers (including halons) containing dangerous substances

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 91/689/EEC on hazardous waste.

Recommendations for the product

Dispose of as hazardous waste.

Recommendations for packaging

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

SECTION 14: Transport information

Land and inland navigation transport ADR/RID

UN 1017 CHLOR, 2.3 + 5.1 + 8, (C1D), ENVIRONMENTALLY HAZARDOUS, Classification code: 2TOC

ADR / RID: Environmentally hazardous substance - special marking: symbol "fish and tree".

Marine transport IMDG

UN 1017 CHLORINE, 2.3 + 5.1 + 8

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MARINE POLLUTANT: Yes

Ems: F-C, S-U

Air transport ICAO/IATA-DGR

UN 1017 Chlorine, 2.3 + 5.1 + 8

ENVIRONMENTALLY HAZARDOUS: Yes

FORBIDDEN

Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

No transport as bulk according IBC - Code.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Other regulations (EU)

Directive 96/82/EC on the control of major-accident hazards involving dangerous substances. Biocide directive (98/8/EC).

15.2. Chemical Safety Assessment

For this substance a chemical safety assessment has been carried out.

Exposure scenarios (ESs) see http://www.ghc.de/pdf_e/es0300.001e.pdf.

SECTION 16: Other information

Recommended uses and restrictions

National and local regulations concerning chemicals shall be observed.

EN 15363 - Chemicals used for treatment of swimming pool water - Chlorine.

EN 937 - Chemicals used for treatment of water intended for human consumption - Chlorine.

Further information

All declarations of safety-data-sheet refer to pure substance.

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product. Indication of changes: "!" = Data changed compared with the previous version.

Wording of the R/H-phrases specified in chapter 3 (not the classification of the mixture!)

R 23 Toxic by inhalation.

R 36/37/38 Irritating to eyes, respiratory system and skin.

R 50 Very toxic to aquatic organisms.

- | | |
|------|---|
| H270 | May cause or intensify fire; oxidiser. |
| 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. |
| H400 | Very toxic to aquatic life. |
| H410 | Very toxic to aquatic life with long lasting effects. |