SAFETY DATA SHEET

LIQUID CHLORINE (PACK)

CAS No.: 7782-50-5

This Safety Data Sheet is issued by Suraj Chemicals as the distributor/supplier of record, based on manufacturer and published GHS / regulatory reference data for this substance. Users should also consult the specific manufacturer's SDS where available.

1. IDENTIFICATION

GHS Product identifier

LIQUID CHLORINE (PACK)
Chlorine, liquefied compressed gas, supplied in cylinders/tonners

CAS: 7782-50-5

Other means of identification

Not relevant

Recommended use of the chemical and restrictions on use

Relevant uses: Disinfection/water treatment, chemical intermediate, biocide, monomer for polymerization. Supplied packed in pressurised cylinders/tonners ("Pack"). For industrial user only.

Uses advised against: All uses not specified in this section or in section 7.3.

Supplier's details

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2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS:
Classification of this product has been carried out in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Acute Tox. 3	Acute inhalation toxicity, Category 3, H331
Aquatic Acute 1	Hazardous to the aquatic environment, acute hazard, Category 1, H400
Eye Irrit. 2	Eye irritation, Category 2, H319
Ox. Gas 1	Oxidising gases, Category 1, H270
Press. Gas (Liq.)	Gases under pressure (Liquefied gas), H280
Skin Irrit. 2	Skin irritation, Category 2, H315
STOT SE 3	Respiratory tract toxicity, single exposure, Category 3, H335

GHS label elements, including precautionary statements

GHS: Danger

Hazard statements

Acute Tox. 3: H331 – Toxic if inhaled.
Aquatic Acute 1: H400 – Very toxic to aquatic life.
Eye Irrit. 2: H319 – Causes serious eye irritation.
Ox. Gas 1: H270 – May cause or intensify fire; oxidizer.
Press. Gas (Liq.): H280 – Contains gas under pressure; may explode if heated.
Skin Irrit. 2: H315 – Causes skin irritation.
STOT SE 3: H335 – May cause respiratory irritation.

Precautionary statements

P220: Keep away from clothing and other combustible materials.
P244: Keep valves and fittings free from oil and grease.
P280: Wear protective gloves/protective clothing/respiratory protection/eye protection/protective footwear.
P302+P352: IF ON SKIN: Wash with plenty of 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.
P403: Store in a well-ventilated place.
P501: Dispose of the contents/containers in accordance with regulations on hazardous waste or packaging and packaging waste, respectively.

Other hazards which do not result in classification

Not relevant

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substances

Chemical description: Chlorine, liquefied under pressure

In accordance with Annex 4.3.3 of the GHS, the product contains:

Identification	Chemical Name / Classification	Concentration
CAS: 7782-50-5	Chlorine — Acute Tox. 3: H331; Aquatic Acute 1: H400; Eye Irrit. 2: H319; Ox. Gas 1: H270; Press. Gas (Liq.): H280; Skin Irrit. 2: H315; STOT SE 3: H335 – Danger	100%

To obtain more information on the hazards of the substances, consult sections 11, 12 and 16.

Mixtures

Non-applicable

4. FIRST AID MEASURES

Description of necessary first-aid measures

Request medical assistance immediately, showing the SDS of this product.

By inhalation

Remove the person affected from the area of exposure, provide fresh air and keep at rest. In serious cases such as cardiorespiratory failure, artificial resuscitation techniques will be necessary (mouth-to-mouth resuscitation, cardiac massage, oxygen supply, etc.) requiring immediate medical assistance.

By skin contact

Remove contaminated clothing and footwear, rinse skin or shower the person affected if appropriate with plenty of cold water and neutral soap. In serious cases see a doctor. If the product causes burns or freezing, clothing should not be removed as this could worsen the injury if it is stuck to the skin. If blisters form on the skin, these should never be burst, as this will increase the risk of infection.

By eye contact

Rinse eyes thoroughly with lukewarm water for at least 15 minutes. Do not allow the person affected to rub or close their eyes. If the injured person uses contact lenses, these should be removed unless they are stuck to the eyes, as this could cause further damage. In all cases, after cleaning, a doctor should be consulted as quickly as possible with the SDS of the product.

By ingestion/aspiration

Do not induce vomiting, but if it does happen keep the head down to avoid aspiration. Keep the person affected at rest. Rinse out the mouth and throat, as they may have been affected during ingestion.

Most important symptoms/effects, acute and delayed

Acute and delayed effects are indicated in sections 2 and 11.

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

Not relevant

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Suitable: Foam extinguisher (AB), Dry Chemical Powder (ABC) Fire Extinguisher, Carbon dioxide extinguisher (BC)
Unsuitable: None

Specific hazards arising from the chemical

Not explosive. Not auto-flammable. Not flammable. The product itself will not burn. Contact with flammables may cause fire or explosions. Contact with organics may cause fire or violent explosions. Contact with minerals may cause fire or violent explosions. Cylinders/tonners may rupture violently ("BLEVE") if exposed to fire.

Special protective actions for fire-fighters

Evacuate all non-essential personnel. Intervention only by capable personnel who are trained and aware of the hazards of the product. In all cases wear self-contained breathing apparatus. When intervention in close proximity, wear full protective acid-resistant suit. After intervention, proceed to clean the equipment (take a shower, remove clothing carefully, clean and check).

Additional provisions

If safe to do so, remove the exposed containers, or cool with large quantities of water from a safe distance/protected position. Approach from upwind. Never spray onto spillage or liquid gas. Depending upon wind direction, warn people of the danger of intoxication and get doors and windows closed with ventilation stopped. Use an explosimeter/gas detector/oxygen analyser to determine the areas of danger.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Isolate leaks provided there is no additional risk for the people performing this task. Personal protection equipment must be used against potential contact with the spilt product (see section 8). Evacuate the area and keep out those who do not have protection.

For emergency responders

Wear protective equipment. Keep unprotected persons away. See section 8. Use an emergency kit (e.g. Chlorine Institute "Kit A/B/C" as applicable to the cylinder/tonner) to control a valve or fitting leak where trained personnel and equipment are available.

Environmental precautions

Avoid at all cost any type of spillage into an aqueous medium. Contain the product absorbed appropriately in hermetically sealed containers. Notify the relevant authority in case of exposure to the general public or the environment.

Methods and materials for containment and cleaning up

Sweep up and shovel product or use other means and place in a container for reuse (preferred) or disposal. For a gas leak, isolate the cylinder valve if it can be done safely, or move the leaking pack to open air/water spray curtain.

Reference to other sections

See sections 8 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling

A. General precautions for safe use

Keep away from reactive products (materials to avoid: reducing agents, combustible materials, metals in powder, acetylene, hydrogen, ammonia, hydrocarbons and organic materials). Prevent all contact with organics. Avoid contact with water or humidity. Handle cylinders/tonners with proper trolleys/hoists; never drop or roll.

B. Technical recommendations for the prevention of fires and explosions

Packs (cylinders/tonners) must be used exclusively for chlorine. Provide a containment bund around storage areas and transfer installations. For bulk storage, consult Suraj Chemicals. Regularly check the conditions and temperature of the containers; secure cylinders upright with chains/racks.

C. Technical recommendations on general occupational hygiene

Do not eat or drink during the process; wash hands afterwards with suitable cleaning products.

D. Technical recommendations to prevent environmental risks

Provide tight electrical equipment well protected against corrosion. Avoid atmospheric emissions. Warn people about the dangers of the product. Follow the protective measures given in the exposure controls/personal protection section. In industrial installations, apply the rules for the prevention of major accidents (consult an expert).

Conditions for safe storage, including any incompatibilities

A. Specific storage requirements

Minimum Temp.	5°C
Maximum Temp.	30°C
Maximum time	6 Months

B. General conditions for storage

Avoid sources of heat, radiation, static electricity and contact with food. Store packs (cylinders/tonners) upright, secured, in a dry, well-ventilated area separate from incompatible materials. For additional information see subsection 10.5.

Specific end use(s)

Except for the instructions already specified, it is not necessary to provide any special recommendation regarding the uses of this product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Substances whose occupational exposure limits have to be assessed in the workplace, per the Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987):

Identification	Occupational Exposure Limit Type	Value
Chlorine CAS: 7782-50-5	Time Weighted average concentration (8 hrs)	1 ppm / 3 mg/m³
	Short-term exposure limit (15 min)	3 ppm / 9 mg/m³

Appropriate engineering controls

It is recommended to use localized extraction in the work area as a collective protection measure to avoid exceeding occupational exposure limits, in addition to individual protective equipment (PPE) as needed. Consult the manufacturer's information leaflet for storage, use, cleaning and maintenance of PPE.

B. Respiratory protection

Filter mask for gases and vapours. Replace when there is a taste or smell of the contaminant inside the face mask; use isolation equipment if the contaminant carries additional warnings.

C. Specific protection for the hands

Protective gloves against minor risks. Replace gloves at any sign of damage; for prolonged exposure, use chemical protection gloves.

D. Eye and face protection

Panoramic glasses against splash/projections. Clean daily and disinfect periodically per manufacturer's instructions; use if there is a risk of splashing.

E. Bodily protection

Antistatic and fireproof protective clothing (limited protection against flames). Safety footwear with antistatic and heat-resistant properties – replace at any sign of deterioration.

F. Additional emergency measures

Emergency shower (ANSI Z358-1, ISO 3864-1:2011, ISO 3864-4:2011) and eyewash stations (DIN 12 899, ISO 3864-1:2011, ISO 3864-4:2011) should be available.

Environmental exposure controls

Avoid environmental spillage of both the product and its container. See subsection 7.1.D.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	
Physical state at 20°C	Liquefied compressed gas
Appearance	Liquefied gas in pressurised cylinder/tonner
Color	Greenish, Yellowish (as gas)
Odor	Chlorine
Odour threshold	Not relevant *
Volatility	
Boiling point at atmospheric pressure	-34°C
Vapour pressure at 20°C / 50°C	Not relevant *
Evaporation rate at 20°C	Not relevant *
Product Description	
Density / Relative density at 20°C	Not relevant *
Dynamic / Kinematic viscosity	Not relevant *
Concentration	Not relevant *
pH	Not relevant *
Vapour density at 20°C	Not relevant *
Partition coefficient n-octanol/water 20°C	Not relevant *
Solubility in water at 20°C	Not relevant *
Decomposition temperature	Not relevant *
Melting point/freezing point	-101°C
Flammability	
Flash Point	Non-applicable
Flammability (solid, gas)	Not relevant *
Autoignition temperature	Not relevant *
Lower / Upper flammability limit	Not relevant *
Particle Characteristics	
Median equivalent diameter	Non-applicable

** Not relevant due to the nature of the product, not providing information on the properties of its hazards.*

Other information

Explosive properties	Not relevant *
Oxidising properties	H270 – May cause or intensify fire; oxidizer.
Corrosive to metals	Not relevant *
Heat of combustion	Not relevant *
Surface tension at 20°C	Not relevant *
Refraction index	Not relevant *

10. STABILITY AND REACTIVITY

Reactivity

Violent reaction with dry titanium. Corrosive action on some metals when moist. The product (liquid form) is not compatible with titanium, ebonite, rubbers, PVC, polyethylene and polypropylene.

Chemical stability

Chemically stable under the indicated conditions of storage, handling and use.

Possibility of hazardous reactions

Under the specified conditions, hazardous reactions that lead to excessive temperatures or pressure are not expected.

Conditions to avoid

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity
Not applicable	Not applicable	Danger of explosion	Avoid direct impact	Avoid contact with moisture

Incompatible materials

Powder / Acetylene / Hydrogen / Ammonia	Water	Reducing Materials	Combustible Materials	Hydrocarbons / Organic Materials
Avoid contact / combustion	Avoid contact with moisture	Avoid direct contact	Avoid contact with combustible materials	Avoid contact

Hazardous decomposition products

Negligible

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

In case of exposure that is repetitive, prolonged, or at concentrations higher than the recommended occupational exposure limits, adverse health effects may result depending on the means of exposure:

A. Ingestion (acute effect)

Acute toxicity classification criteria are not met based on available data. Consumption of a considerable dose can cause irritation in the throat, abdominal pain, nausea and vomiting.

B. Inhalation (acute effect)

Inhalation after prolonged exposure may be lethal. Causes irritation in respiratory passages, normally reversible and limited to the upper respiratory passages.

C. Contact with skin and eyes (acute effect)

Skin contact produces inflammation. Eye contact produces eye damage after contact.

D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity)

Classification criteria for carcinogenicity, mutagenicity and reproductive toxicity are not met based on available data. IARC: Not relevant.

E. Sensitizing effects

Classification criteria for respiratory or skin sensitisation are not met based on available data.

F. Specific target organ toxicity (STOT) – single exposure

Causes irritation in respiratory passages, normally reversible and limited to the upper respiratory passages.

G. Specific target organ toxicity (STOT) – repeated exposure

Classification criteria are not met based on available data.

H. Aspiration hazard

Classification criteria are not met based on available data.

Product-specific toxicological information

Identification	Acute Toxicity	Genus
Chlorine CAS: 7782-50-5	LD50 dermal: >10000 mg/kg	Rabbit
	LC50 inhalation: 0.5 mg/L (ATEi)	–

12. ECOLOGICAL INFORMATION

Very toxic to aquatic life.

Toxicity

Identification	Acute Toxicity	Species	Genus
Chlorine CAS: 7782-50-5	LC50: 0.39 mg/L (96h)	Lepomis macrochirus	Fish
	EC50: 0.141 mg/L (48h)	Daphnia magna	Crustacean

Persistence and degradability

Not available

Bioaccumulative potential

Not available

Mobility in soil

Koc	Henry	Dry Soil	Moist Soil
Not relevant	Not relevant	No	No

Results of PBT and vPvB assessment

Non-applicable

Other adverse effects

Not described

13. DISPOSAL CONSIDERATIONS

Disposal methods

Absorb the product in an alkaline solution (caustic soda or sodium carbonate), or reduce the product with sulfite, pyrosulfite or alkaline thiosulfate. For packaging: return empty cylinders/tonners to the supplier – do not attempt to refill, modify or dispose of gas cylinders independently. Refer to national and local regulations on waste management.

14. TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR/RID)

14.1 UN number	UN1017
14.2 UN proper shipping name	CHLORINE
14.3 Transport hazard class(es)	2.3 (Labels: 5.1, 8)
14.4 Packing group	N/A
14.5 Environmental hazard	Yes
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk	Not relevant

Transport of dangerous goods by sea (IMDG)

14.1 UN number	UN1017
14.2 UN proper shipping name	CHLORINE
14.3 Transport hazard class(es)	2.3 (Labels: 5.1, 8)
14.4 Packing group	N/A
14.5 Marine pollutant	Yes
14.6 Special precautions for user	EmS Codes: F-, S-U | Limited quantities: 0 | Segregation group: Not relevant
14.7 Transport in bulk	Not relevant

Transport of dangerous goods by air (IATA/ICAO)

14.1 UN number	UN1017
14.2 UN proper shipping name	CHLORINE
14.3 Transport hazard class(es)	2.3 (Labels: 5.1, 8)
14.4 Packing group	N/A
14.5 Environmental hazard	Yes
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk	Not relevant

15. REGULATORY INFORMATION

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

It is recommended to use the information included in this safety data sheet as data used in a risk evaluation of local circumstances, in order to establish the necessary risk prevention measures for the manipulation, use, storage and disposal of this product.

Other legislation

Manufacture, Storage and Import of Hazardous Chemicals Rules 1989
The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987)
The Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996
Public Liability Insurance Act, 1991

16. OTHER INFORMATION

Legislation related to safety data sheets

This safety data sheet has been designed in accordance with Annex 4 – Guidance on the preparation of Safety Data Sheets of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Texts of the legislative phrases mentioned in sections 2 and 3

H270: May cause or intensify fire; oxidizer.
H280: Contains gas under pressure; may explode if heated.
H331: Toxic if inhaled.
H315: Causes skin irritation.
H335: May cause respiratory irritation.
H400: Very toxic to aquatic life.
H319: Causes serious eye irritation.

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3.

Advice related to training

Minimal training is recommended to prevent industrial risks for staff using this product, in order to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources

The United Nations Economic Commission for Europe (UNECE)

Abbreviations and acronyms

ADR: European agreement concerning the international carriage of dangerous goods by road | IMDG: International maritime dangerous goods code | IATA: International Air Transport Association | ICAO: International Civil Aviation Organisation | LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50 | IARC: International Agency for Research on Cancer

Disclaimer: The information contained in this safety data sheet is based on sources, technical knowledge and current legislation, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product; it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within Suraj Chemicals' awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

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