## 1. Identification

**Chemical or mixture (trade name):**Chlorine ($Cl_2$)

**Main recommended uses for the substance or mixture:**exclusively industrial use

**Company Name:** Katrium Chemical Industries Ltd.

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**Emergency telephone number: SUATRANS COTEC -** Or 0800 707 7022 0800 17 2020

**Internet:**www.katrium.com.br

## 2. Hazards identification

**the substance or mixture:**

oxidizing gases Category 1

Gas pressure: Compressed gas - Acute toxicity - Inhalation: Category 2

Corrosion / skin irritation: Category 2

Serious eye damage / eye irritation: Category 2A

Toxicity for specific target organs - single exposure: Category 3

Hazardous to the aquatic environment - Acute Category 1

Hazardous to the aquatic environment - Chronic Category 1

**GHS label elements**

**Words of warning:**Danger

**Phrase (s) of danger:**H270 - May cause or intensify fire; oxidizer - H280 - Contains gas under pressure: may explode under the action of heat - H330 - Fatal if inhaled - H315 - Causes skin irritation - H319 - Causes serious eye irritation - H335 - May cause irritation airways - H400 - Very toxic to aquatic organisms - H410 - Very toxic to aquatic life with long lasting effects.

**Phrase (s) of caution:**

- **General:**Not appropriate.
- **Prevention:**P271 - Use only outdoors or in well-ventilated areas - P284 - [In case of inadequate ventilation] Use respiratory protective equipment - P273 - Avoid release to the environment.
- **the emergency response:**P370 + P376 - In case of fire: Contain the leak if it can be done safely - P304 + P340 - IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing - P391 - Collection spilled material.

**Other hazards which do not result in classification:**Chlorine combines with various substances may react with most organic compounds and elements, and in some cases, can form explosive mixtures. If at elevated temperature reacts with metals. Forms explosive compounds to react with acetylene, ether, ammonia, hydrogen and finely divided metals.
**Other information:**Not available.

## 3. Composition and information about ingredients

**Product type: Substance**

**Ingredients or impurities contributing to hazard:**

| Common chemical name or technical | CAS | Concentration or concentration range (%) |
|---|---|---|
| CHLORINE | 7782-50-5 | > 99 |

## 4. First aid actions

**First aid actions**

- **Inhalation:**Remove the subject from the contaminated areas as soon as possible. Transport it to a well-ventilated place. Administer oxygen if the victims breathing with difficulty. Seek immediate medical attention.
- **Skin contact:**Remove contaminated clothing and shoes. Wash the affected with water. Consult a doctor immediately.
- **Eye contact:**Flush eyes as soon as possible, running water for 20 minutes holding the eyelids open. Consult a doctor immediately.
- **ingestion:**Not applicable. gaseous product.

**Most important symptoms and effects, acute and delayed:**Chlorine is irritating to the respiratory tract. The effects depend on the concentration and exposure time to the product.
**Notes to physician:**Avoid contact with the product while helping the victim. symptomatic and supportive treatment, according to the clinical picture, with respiratory assistance. In case of contact with the skin does not rub the affected area.

## 5. Fire fighting measures

**Suitable extinguishing agents:** Not explosive / Not flammable.
Small proportions: Compatible with extinguishers. Major: Water or fog or foam.
**Unsuitable extinguishing media:**Water jets directly.
**Specific hazards of the substance or mixture:**The combustion of the chemical or its packaging can form toxic and irritant gases.
**Protective measures of the fire fighting team:**Use breathing apparatus autônoma.Evite contact with the material during fire fighting. If contact is unavoidable, use chemical resistant clothing.

## 6. control measures to spill or leak

**Personal precautions, protective equipment and emergency procedures**

- **For staff that is not part of the emergency services:** Isolate the location of the leak and ignition sources. Prevent sparks or flames. Do not smoke. Do not touch damaged containers or spilled material without the use of appropriate clothing. Use personal protective equipment as described in Section 8.
- **For emergency service personnel:**Use personal protective equipment described in section 8.

**Environmental precautions:**Avoid environmental contamination. Stop leak if this can be done without risk.

**Methods and materials for sealing and containing:**Stop the gas leak if you can do it without risk. Stay downwind. Use water fog to reduce or divert vapor cloud.

**area isolation:**Keep unauthorized persons away.

**Methods and materials for cleaning:**Wash the affected area, directing the waste to a suitable disposal or collection point. Do not pour water on spill or leak source. For disposal proceed pursuant to Section 13 of this MSDS.

## 7. Handling and Storage

**Precautions for safe handling**

- **Worker exposure prevention:** Use personal protective equipment as described in Section 8.
- **Fire and explosion prevention:**The substance is not flammable.
- **Precautions and guidelines for safe handling:**The usual precautions for handling chemicals should be observed. Avoid any direct contact with the material.
- **Hygiene measures**
  - **appropriate:**Wash hands before breaks and at the end of the working period. Do not eat food or smoke during the work period. Remove contaminated clothing immediately.
  - **inappropriate:**Do not eat, drink or smoke when handling the product.

**Safe storage conditions**

- **appropriate conditions:**Store in a well ventilated place, away from sunlight. Keep container closed. It is not necessary to add stabilizers and antioxidants to ensure product durability. This product may react dangerously with some incompatible materials as outlined in Section 10.
- **Conditions that should be avoided, including any incompatibilities:**Do not mix with incompatible materials (see "stability and reactivity" section).
- **Packaging materials**
  - **recommended:**Steel cylinders built according to specific standards.
  - **inadequate:**All others who do not meet the above guidance, depending on the nature of the product and the pressure class required for storage.

**Other information:**Keep away from heat, high temperatures and incompatible materials.If possible leakage sealed using plugs, sealing strap or reversing the hole / slot / crumpled up. Collect all the material in containers suitable and properly labeled for subsequent treatment and disposal. Waste must be disposed of according to environmental local, state or federal law. To verify an appropriate location overflow and perform the security procedures described above.

## 8. Exposure control and personal protection

**Control parameters**

- **Occupational exposure limits:** NR 15: 0.8 ppm (2.3 mg / $m^3$) 48 hours / week.
- **Biological indicators:**There are biological indicators of exposure established by Brazilian legislation - NR 07.

**Engineering control measures:**Promote direct mechanical ventilation and exhaust system to the outside environment. These measures help reduce the exposure to the product. It is recommended to make available emergency showers and eye wash in work area. Maintaining the concentrations of the substance or mixture in air indicated below the limits of occupational exposure.

**Personal protective measures**

- **eye / face protection:**wide vision goggles, face shield
- **Skin Protection:**Infant Tychem or PVC, rubber or PVC boots
- **Breath protection:**full face mask with a filter against acid gases, full face mask with autonomous air line or set of breathable air. The half mask should only be used to escape.
- **Hand protection:**Glove of rubber or PVC.
- **Thermal Hazards:**Use personal protection when handling the heated substance and follow work procedures and breaks in the work in hot environments.

## 9. Physical and chemical properties

- **Aspect:**
  **physical state:** gas (at 20 ° C and 1013 hPa); Form: liquid and gas; Color: Yellow-green
- **Odor:**Pungent, irritating
- **Odor threshold:**Not available
- **pH:**5.5 (0.7% solution)
- **Melting point / freezing point:**- 101.05 ° C
- **Initial boiling point:** - C 34,05º
- **Boiling Temperature Range:**Not available
- **Flash Point:**Non flammable
- **Evaporation rate:**Not available
- **Flammability (solid, gas):**Non flammable
- **lower flammability limit or explosive:** Not available
- **flammability limit or greater explosiveness:** Not available
- **Steam pressure:**5830 mmHg at 0 ° C
- **Vapor Density:**Not available
- **Relative density:**3.21 kg / $m^3$
- **Solubility (s):**0.7% at 20 ° C
- **Partition coefficient - n - octanol / water:** Not available
- **Autoignition Temperature:**Not available
- **Decomposition temperature:**Not available
- **Viscosity:**Not available

## 10. Stability and reactivity

**Chemical stability:**Stable under normal temperature and pressure conditions.
**Reactivity:**Not available.
**Possibility of hazardous reactions:**Chlorine combines with various substances may react with most organic compounds and elements, and in some cases, can form explosive mixtures. If at elevated temperature reacts with metals. Forms explosive compounds to react with acetylene, ether, ammonia, hydrogen and finely divided metals.
**Conditions to avoid:**High temperatures, ignition sources and contact with incompatible materials.
**Incompatible materials:**Ammonia, combustible materials, acetylene, ether, ammonia, hydrogen and metals.
**Hazardous decomposition products:**toxic and irritating gases and vapors.

## 11. toxicological information

**Acute toxicity:** Fatal if inhaled. In contact with skin and / or eyes, irritation.
**Corrosion / skin irritation:** It causes skin irritation
**Serious eye damage / irritation:** Causes serious eye irritation
**respiratory or skin sensitization:** May result in respiratory irritation
**Germ cell mutagenicity:**Conclusion: not sufficient for classification
**carcinogenicity:**Conclusion: not sufficient for classification. Not classifiable as a human carcinogen (A4 Category - ACGIH)
**Reproductive toxicity:** Conclusion: not sufficient for classification
**Toxicity for specific target organs - single exposure:** May result in respiratory irritation
**Toxicity for specific target organs - repeated exposure:** Conclusion: not sufficient for classification
**Aspiration hazard:** May result in respiratory irritation
**Other information:** Very toxic to aquatic life with long lasting effects.

## 12. ecological information

**ecotoxicity:** Chlorine generates moderate toxicity to aquatic organisms, it is not biodegradable and is not bioaccumulated in the body.
**Persistence and degradability:** Not available
**bioaccumulative potential:** Not potentially bioaccumulative
**Mobility in soil:** Not available
**Other adverse effects:** Do not allow that he shall come tanks, rivers and rainwater.

## 13. Considerations disposal

**Recommended methods for disposal**

- **Product:**Keep any leftover product in their original containers tightly closed. Do not dispose in sewer systems, waterways and sewage treatment plants.
- **Used packaging:**Keep container tightly closed and sealed until ready for use. Use original container.

## 14. Transport Information

**National and international regulations:**

**land:**

- **UN:**1017
- **Proper Shipping Name:**CHLORINE
- **Class / Subclass:**2.3
- **Number of risk:**268
- **Packing group:**Not applicable
- **Dangerous for the environment:**Yes
- **Ground rules:**National Land Transportation Agency - Law 10,233 of June 5, 2001. NBR 7503/08

## 15. Regulatory Information

**specific safety regulations, health and the environment for the chemical:**

BRAZIL - MINISTRY OF LABOR - NR 26 - Decree 229.

BRAZIL - MINISTRY OF TRANSPORT - ANTT - Resolution No. 5232, of December 14, 2016.

BRAZIL - ABNT NBR 14725 Parts 1, 2, 3 and 4.

BRAZIL - MINISTRY OF LABOR - Decree 2657.

## 16. Other information

**important information, but not specifically described the previous sections:**

This MSDS was based on the current knowledge of the product and provides information on the protection, safety, health and the environment.

The caveat is that the handling of any chemical substance requires prior knowledge of its hazards for the user. It is up to the user company's product promotes training of its employees and contractors about the possible risks from the product.

**References:** [ABNT] ASSOCIATION BRAZILIAN TECHNICAL STANDARDS NBR 14725.

BRAZIL. Ministry of Transport. National Land Transportation Agency.

[ECHA] European Union. ECHA European Chemical Agency

**Captions and abbreviations:** CAS - Chemical Abstracts Service