

Material Safety Data Sheet

Printing date 01/05/2009

Version 5

Reviewed on 01/05/2009

1 Identification of substance

· **Product details**

· **Trade name:** Trichlorosilane

· **Article number:** 127-01-0011

· **Creation date:** 08/06/2008

· **Manufacturer/Supplier:**

Linde Canada Limited

5860 Chedworth Way

Mississauga, Ontario L5R 0A2

Telephone (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

(905) 501-0802

Linde

575 Mountain Avenue

Murray Hill, NJ 07974

Telephone (908) 464-8100

24-HOUR EMERGENCY TELEPHONE NUMBER:




CHEMTREC (800) 424-9300

· **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

· **Chemical characterization**

· **Dangerous components:**

10025-78-2	trichlorosilane	5 - <23%
Danger:  2.6/1, 2.9/1, 2.12/1;  3.1.O/3, 3.1.I/4;  3.2/1A		

3 Hazards identification

· **Hazard description:**

D2B - Toxic material causing other toxic effects



Corrosive

Extremely flammable

· **WHMIS-symbols:**

Liquified gas.

B6 - Reactive flammable material

A - Compressed gas

B1 - Flammable gas

E - Corrosive material

F - Dangerously reactive material



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· **HMIS-ratings (scale 0 - 4)**

HEALTH	4	Health = 4
FIRE	4	Fire = 4
REACTIVITY	2	Reactivity = 2

· **NFPA ratings (scale 0 - 4)**

4	4	2	Health = 4
4	4	2	Fire = 4
4	4	2	Reactivity = 2

· **Information pertaining to particular dangers for man and environment:**

The product has to be labelled due to the calculation procedure of international guidelines.

Extremely flammable.

Reacts violently with water.

Spontaneously flammable in air.

Harmful by inhalation and if swallowed.

Contact with water liberates toxic gas.

Causes severe burns.

Irritating to respiratory system.

· **Classification system:**

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

· **GHS label elements****Danger**

2.2/1 - Extremely flammable gas.

**Danger**

3.2/1A - Causes severe skin burns and eye damage.

**Warning**

3.1/4 - Harmful if swallowed.

3.1/4 - Harmful if inhaled.

3.8/3 - May cause respiratory irritation.

· **Prevention:**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Do not breathe dust/fume/gas/mist/vapours/spray.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

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

· **Response:**

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

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IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 Immediately call a POISON CENTER or doctor/physician.
 Call a POISON CENTER or doctor/physician if you feel unwell.
 Specific treatment (see label).
 Rinse mouth.
 Wash contaminated clothing before reuse.
 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
 Eliminate all ignition sources if safe to do so.

- **Storage:**
 Store in a well-ventilated place.
 Store in a well-ventilated place. Keep container tightly closed.
 Store locked up.
- **Disposal:**
 Dispose of contents/container in accordance with local/regional/national/international regulations.

4 First aid measures

- **General information:**
 Immediately remove any clothing soiled by the product.
 Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
- **After inhalation:**
 Supply fresh air. If required, provide artificial respiration and consult doctor. Keep patient warm. Consult doctor if symptoms persist.
 In case of unconsciousness place patient stably on the body side position.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly for at least 15 minutes.
- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.
- **After swallowing:** Immediately call a doctor.

5 Fire fighting measures

- **Suitable extinguishing agents:**
 Extinguishing powder. Do not use water.
 CO₂, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents:** Water
- **Protective equipment:** Wear self-contained respiratory protective device.

6 Accidental release measures

- **Person-related safety precautions:**
 Mount respiratory protective device.
 Wear protective equipment. Keep unprotected persons away.
 Ensure adequate ventilation.
 Eliminate ignition sources
 Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:**
 Prevent seepage into sewage system, workpits and/or cellars.
 In case of gas release or seepage into the ground inform responsible authorities.
- **Measures for cleaning/collecting:**
 Use neutralizing agent.
 Dispose contaminated material as waste according to item 13.

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Ensure adequate ventillation.
Do not flush with water or aqueous cleansing agents

7 Handling and storage

- **Handling:** Do not mix with air or oxygen above atmospheric pressure.
- **Information for safe handling:**
 - Ensure good ventilation/exhaustion at the workplace.
 - Open and handle cylinder with care.
 - Handle with care. Avoid jolting, friction, and impact.
 - Use only in well ventilated areas.
 - Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.
- **Information about protection against explosions and fires:**
 - Keep ignition sources away - Do not smoke.
 - Protect against electrostatic charges.
 - Prevent impact and friction.
 - Keep respiratory protective device available.
 - Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
 - Fumes can combine with air to form an explosive mixture.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
 - Store in a cool location.
 - Do not expose cylinder to temperatures higher than 50°C (122 °F)
- **Information about storage in one common storage facility:**
 - Store away from oxidizing agents.
 - Store separately from cylinders containing oxygen or oxidants by a minimum distance of 20' or by a barrier of non-combustible material at least 5' high having a fire resistant rating of at least 30minutes.
 - Sources of ignition should be removed from storage area.
- **Further information about storage conditions:**
 - Keep cylinder valve tightly closed.
 - Store in cool, dry conditions in well sealed receptacles.
 - Protect from heat and direct sunlight.
 - Store cylinder in a well ventilated area.
 - Store in accordance with local fire code and/or building code or any pertaining regulations.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**
 - Adequate local ventillation.
 - Safety showers and eyewash stations should be nearby.
- **Components with limit values that require monitoring at the workplace:**
 - The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Additional information:** The lists that were valid during the creation were used as basis.
- **Personal protective equipment:**
- **General protective and hygienic measures:**
 - Keep away from foodstuffs, beverages and feed.
 - Immediately remove all soiled and contaminated clothing.
 - Wash hands before breaks and at the end of work.

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Avoid contact with the eyes and skin.
 Protective clothing should be kept free of oil and grease.
 PPE should be inspected and maintained regularly to retain its effectiveness.

- **Breathing equipment:**

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

- **Protection of hands:**



Protective gloves.

- **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

- **Eye protection:** Safety glasses

9 Physical and chemical properties

- **General Information**

Form:	Liquefied gas
Color:	Colorless
Odor:	Odorless

- **Change in condition**

Boiling point/Boiling range: 32°C

- **Flash point:** < 0°C

- **Ignition temperature:** 195°C

- **Auto igniting:** Spontaneously flammable in air.

- **Danger of explosion:** In use, may form flammable/explosive vapour-air mixture.

- **Explosion limits:**

Lower: 6.9 Vol %

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

- **Dangerous reactions**

May form explosive gas mixture with air.

Contact with water releases toxic gases.

Contact with acids releases toxic gases.

May react with oxidizing agents.

- **Dangerous products of decomposition:** No dangerous decomposition products known.

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11 Toxicological information· **Acute toxicity:**· **LD/LC50 values that are relevant for classification:****10025-78-2 trichlorosilane**

Oral	LD50	1030 mg/kg (rat)
Inhalative	LC50/4hr	1040 ppm (rat)

· **Primary irritant effect:**· **on the skin:**

Strong caustic effect on skin and mucous membranes.

Irritant to skin and mucous membranes.

· **on the eye:** Strong caustic effect.· **Sensitization:** No sensitizing effects known.· **Additional toxicological information:**

The product shows the following dangers according to internally approved calculation methods for preparations:

Harmful

Corrosive

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

12 Ecological information· **General notes:** Must not reach bodies of water or drainage ditch undiluted or unneutralized.**13 Disposal considerations**· **Product:**· **Recommendation:** Unused product should be returned to vendor.· **Uncleaned packagings:**· **Recommendation:**

Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.

· **Recommended cleansing agent:** None applicable.**14 Transport information**· **Maritime transport IMDG:**· **Marine pollutant:** No**15 Regulations**· **Sara**· **Section 355 (extremely hazardous substances):**

None of the ingredient is listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients is listed.

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· **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

· **Proposition 65**· **Chemicals known to cause cancer:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients is listed.

· **Cancerogenity categories**· **EPA (Environmental Protection Agency)**

None of the ingredients is listed.

· **NTP (National Toxicology Program)**

None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**

None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

· **Canadian substance listings:**· **Canadian Domestic Substances List (DSL)**

All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

None of the ingredients is listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

All ingredients are listed.

· **Product related hazard informations:**

The product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

· **Hazard symbols:**

Corrosive
Extremely flammable

· **Hazard-determining components of labelling:**

trichlorosilane

· **Risk phrases:**

Extremely flammable.
Reacts violently with water.
Spontaneously flammable in air.
Harmful by inhalation and if swallowed.
Contact with water liberates toxic gas.
Causes severe burns.
Irritating to respiratory system.

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· **Safety phrases:**

Keep container tightly closed in a cool place.

Keep container dry.

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Wear suitable protective clothing, gloves and eye/face protection.

In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

This material and its container must be disposed of as hazardous waste.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

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· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· **Abbreviations and Acronyms:**

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

N/A: Not Applicable