

Material Safety Data Sheet

Printing date 02/03/2009

Version 7

Reviewed on 02/03/2009

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1 Identification of substance

- **Product details**
- **Trade name:** Trichlorosilane
- **Article number:** 127-01-0011
- **Creation date:** 08/06/2008
- **Manufacturer/Supplier:**

Linde Canada Limited	Linde	.
5860 Chedworth Way	575 Mountain Avenue	.
Mississauga, Ontario L5R 0A2	Murray Hill, NJ 07974	.
Telephone (905) 501-1700	Telephone (908) 464-8100	.
24-HOUR EMERGENCY TELEPHONE NUMBER: (905) 501-0802	24-HOUR EMERGENCY TELEPHONE NUMBER: CHEMTREC (800) 424-9300 OR Linde National Operations Center (800) 232-4726	.
- **Information department:** Customer Service Centre: 1-866-385-5349

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2 Composition/Data on components

- **Chemical characterization:**
- **CAS No. Description**
10025-78-2 trichlorosilane
- **Identification number(s)**
- **EINECS Number:** 233-042-5
- **Index number:** 014-001-00-9

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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			Fire = 4
			Reactivity = 2

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

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.

· **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**

2.2/1 - Extremely flammable gas.
 2.12/1 - In contact with water releases flammable gases which may ignite spontaneously.



3.1/3 - Toxic if swallowed.
 3.1/4 - Harmful if inhaled.



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

· **Prevention:**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
 Handle under inert gas. Protect from moisture.
 Keep container tightly closed.
 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: Immediately call a POISON CENTER or doctor/physician.
 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.

Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.

Wash contaminated clothing before reuse.

In case of fire: Use for extinction: CO₂, powder or water spray.

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 dry place. Store in a closed container.

Store in a well-ventilated place.

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.

· **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:** Not required.
- **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.
 - Avoid contact with the eyes and skin.
 - Protective clothing should be kept free of oil and grease.

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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**

Melting point/Melting range:	-128°C
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 %
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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.

· on the eye: Strong caustic effect.

· Sensitization: No sensitizing effects known.

· Additional toxicological information:

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

· TDG and DOT regulations:



· Hazard class: 4.3

· Identification number: UN1295

· Packing group: I

· Proper shipping name (technical name): TRICHLOROSILANE

· Label: 4.3+3+8

· Packaging group: I

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· Maritime transport IMDG:



- **IMDG Class:** 4.3
- **UN Number:** 1295
- **Label** 4.3+3+8
- **Packaging group:** I
- **EMS Number:** F-G,S-O
- **Marine pollutant:** No
- **Proper shipping name:** TRICHLOROSILANE

· Air transport ICAO-TI and IATA-DGR:



- **ICAO/IATA Class:** 4.3
- **UN/ID Number:** 1295
- **Label** 4.3+3+8
- **Packaging group:** I
- **Propper shipping name:** TRICHLOROSILANE

- **UN "Model Regulation":** UN1295, TRICHLOROSILANE, 4.3 (3+8), I

* **15 Regulations**

· Sara

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

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

Substance is not listed.

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

Substance is listed.

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

Substance is not listed.

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

Substance is not listed.

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

Substance is not listed.

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

Substance is not listed.

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

Substance is not listed.

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· NTP (National Toxicology Program)

Substance is not listed.

· TLV (Threshold Limit Value established by ACGIH)

Substance is not listed.

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

Substance is not listed.

· OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

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

Substance is listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

Substance is not listed.

· Canadian Ingredient Disclosure list (limit 1%)

Substance is 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

· 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.

· Safety phrases:

Keep out of the reach of children.
Keep container tightly closed and in a well-ventilated place.
Keep away from sources of ignition - No smoking.
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 fire, use ... (indicate in the space the precise type of fire-fighting equipment. If water increases risk, add 'Never use water').

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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GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· **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

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