

Trichlorosilane

Safety Data Sheet P-4823

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1984 Revision date: 03/02/2017 Supersedes: 12/13/2016

SECTION 1: Product and company identification

1.1. Product identifier

Product form : Substance
 Substance name : Trichlorosilane
 CAS No : 10025-78-2
 Formula : Cl₃HSi
 Other means of identification : Chlorosilane A-19, Silicochloroform, silicon tetrafluoride, trichloromonosilane

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

Use of the substance/mixture : Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Medical Testing Solutions
 20283 SR 7 #300, Boca Raton, FL 33498
www.medicaltestingsolutions.com

1.4. Emergency telephone number

Emergency number : (954) 603-9046

We are available Monday to Friday, 9:00 A.M -5:00 P.M.

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Liq. 1 H224
 Water-react. 1 H260
 Acute Tox. 4 (Oral) H302
 Skin Corr. 1A H314
 Eye Dam. 1 H318
 STOT SE 3 H335

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H224 - EXTREMELY FLAMMABLE LIQUID AND VAPOR
 H260 - IN CONTACT WITH WATER RELEASES FLAMMABLE GASES WHICH MAY IGNITE SPONTANEOUSLY
 H314 - CAUSES SEVERE SKIN BURNS AND EYE DAMAGE
 H332 - Harmful if inhaled
 CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
 CGA-HG22 - CORROSIVE TO THE RESPIRATORY TRACT

Precautionary statements (GHS-US) :

P202 - Do not handle until all safety precautions have been read and understood
 P210 - Keep away from Heat/Open flames/Sparks/Hot surfaces. - No smoking
 P222 - Do not allow contact with air.
 P223 - Do not allow contact with water

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P231+P232 - Handle under inert gas. Protect from moisture.
 P233 - Keep container tightly closed.
 P240 - Ground/Bond container and receiving equipment
 P241 - Use explosion-proof electrical, ventilating and lighting equipment
 P242 - Use only non-sparking tools.
 P243 - Take precautionary measures against static discharge.
 P260 - Do not breathe vapors
 P261 - Avoid breathing gas, vapors
 P264 - Wash hands thoroughly after handling
 P271+P403 - Use and store only outdoors or in a well-ventilated place.
 P280 - Wear protective gloves/protective clothing/eye protection/face protection
 P370+P378 - In case of fire: Use AFFF alcohol-compatible foam to extinguish
 P381 - Eliminate all ignition sources if safe to do so.
 P405 - Store locked up
 P501 - Dispose of contents/container in accordance with container Supplier/owner instructions
 CGA-PG05 - Use a back flow preventive device in the piping.
 CGA-PG20+CGA-PG10 - Use only with equipment of compatible materials of construction and rated for cylinder pressure.
 CGA-PG12 - Do not open valve until connected to equipment prepared for use.
 CGA-PG06 - Close valve after each use and when empty.
 CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

2.3. Other hazards

Other hazards not contributing to the classification : Reacts with moisture to form hydrochloric acid (aqueous hydrogen chloride).
 Trace amounts may be present in the product.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Trichlorosilane (Main constituent)	(CAS No) 10025-78-2	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician. . WARNING: To avoid possible chemical burns, the rescuer should avoid breathing any exhaled air from the victim.

First-aid measures after skin contact : In case of contact, immediately flush affected areas with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Discard contaminated shoes.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately..

First-aid measures after ingestion : Do NOT induce vomiting. If patient is fully conscious, give two glasses of milk or water at once. Get immediate medical attention. Never give anything by mouth to an unconscious person.

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

Symptoms/injuries after inhalation : May cause respiratory irritation.
 Symptoms/injuries after eye contact : Causes serious eye damage.
 Symptoms/injuries after ingestion : Swallowing a small quantity of this material will result in serious health hazard.

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

No additional information available



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SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS THE LEAK CAN BE STOPPED. Carbon dioxide. Dry sand. Alcohol resistant foam.
- Unsuitable extinguishing media : Water. Dry chemical, soda ash or lime.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : **DANGER! Flammable, corrosive liquid and vapor.** .
- Explosion hazard : Dousing fire with water might generate hydrogen gas creating dangerous explosion hazard especially in confined areas. Vapors may form explosive mixture with air and oxidizing agents.
- Reactivity : Vapor has a very low autoignition temperature. (~ 220 °F (104 °C)). May ignite on hot surfaces at about this temperature or greater. Vapor burns rapidly in air. Reacts violently with water to form hydrogen chloride fumes.

5.3. Advice for firefighters

- Firefighting instructions : **DANGER! Flammable, corrosive liquid and vapor.**
- Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.
- Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
- Specific methods : If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.
- In large fires where leakage may occur, water spray may be used **if applied in quantities sufficient to absorb the heat of reaction and knock down the hydrogen chloride fumes.**
- For small fires, use copious quantities of water spray to react with the chlorosilane, which reacts violently with water to form hydrogen chloride fumes. Despite the reaction with water, trichlorosilane fires can be extinguished with a 6 percent solution in water of medium-expansion Hazmat II foam.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : **DANGER! Flammable, corrosive liquid and vapor.** .

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

- Methods for cleaning up : Small spills may be absorbed on an acid spill pillow or hydrolyzed with large quantities of water. If the product is absorbed on an acid spill pillow, place the pillow in a large quantity of water and allow it to dissolve (hydrolyze). In either case, ensure that the hydrolyzed product can be safely vented.

6.4. Reference to other sections

No additional information available



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SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Additional hazards when processed : Handle empty containers with care because residual vapors are flammable. Keep away from any possible contact with water, because of violent reaction and possible flash fire.
- Precautions for safe handling : MAY BE FATAL IF SWALLOWED
- WARNING : May be harmful if inhaled or absorbed.
- Do not swallow liquid.
- Do not breathe vapors.
- May irritate skin, eyes, and respiratory tract. Use only with adequate ventilation or respiratory protection. Do not get liquid or vapor in eyes, on skin, or on clothing. Have safety showers and eyewash fountains immediately available. May form explosive mixtures with air. Keep away from heat, sparks, and open flame. Use only spark-proof tools and explosion-proof equipment. Protect containers from damage. Use a suitable hand truck to move containers; do not drag, roll, slide, or drop. For other precautions in using this product, see section 16.
- Protect from moisture.
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.
- Vapor has a very low autoignition temperature
- VAPOR MAY CAUSE FLASH FIRE (OR EXPLOSION)
- Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g, wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.
- Safe use of the product : Trichlorosilane vapors react with moisture in air to produce dense white clouds of silica and hydrogen chloride. Therefore, this product should be confined within enclosed equipment and should not be vented directly to the air. Where venting is necessary, trichlorosilane should be vented through a scrubber system equipped to handle hydrogen chloride.
- WARNING: Hot organic chemical vapors or mists are susceptible to sudden spontaneous combustion when mixed with air. Ignition may occur at temperatures below those published in the literature as "autoignition" or "ignition" temperatures. Ignition temperatures decrease with increasing vapor volume and vapor/air contact time, and are influenced by pressure changes.**
- Ignition may occur at typical elevated-temperature process conditions, especially in processes operating under vacuum if subjected to sudden ingress of air or in outside process equipment operating under elevated pressure if a sudden escape of vapors or mists to the atmosphere occurs.
- Any proposed use of this product in elevated-temperature processes should be thoroughly evaluated to ensure that safe operating conditions are established and maintained.



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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : All equipment in storage areas must be explosion-proof. Electric installation in storage areas must meet the requirements of National Electric Code (NEC) Article 500. This material is a static accumulator. To avoid ignition of vapors by static discharge, all metal parts and equipment must be grounded. Follow NFPA 77, Recommended Practice on Static Electricity (www.nfpa.org), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents.

Keep in fireproof place.

Store in a dry place.

Protect from moisture.

Store only where temperature will not exceed 125°F (52°C). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

Conditions to avoid : Sources of ignition. Heat sources. Keep away from any possible contact with water, because of violent reaction and possible flash fire.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Trichlorosilane (10025-78-2)	
ACGIH	Not established
USA OSHA	Not established

8.2. Exposure controls

Appropriate engineering controls : Use corrosion-resistant equipment. Use an explosion-proof local exhaust system with sufficient flow velocity to maintain an adequate supply of air in the worker's breathing zone. Mechanical/General measures: Use in a closed system. A canopy-type, forced-draft fume hood is preferred.

In semiconductor process gas and other suitable applications, Praxair recommends the use of engineering controls such as gas cabinet enclosures, automatic gas panels (used to purge systems on cylinder changeout), excess-flow valves throughout the gas distribution system, double containment for the distribution system, and continuous gas monitors.

Eye protection : Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

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Respiratory protection	: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).
Other information	: Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Colorless liquid.
Color	: Colorless
Odor	: sharp choking
Odor threshold	: No data available
pH	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: -126.6 °C
Freezing point	: No data available
Boiling point	: 31.8 - 36.5 °C (at 760 mmHg)
Flash point	: -27.8 °C
Critical temperature	: 205.9 °C
Auto-ignition temperature	: 104 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: 1.2 - 90.5 vol %
Vapor pressure	: 533 hPa (at 14.5 °C)
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Density	: 1.35 g/cm ³ (at 0 °C)
Solubility	: Water:
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: May form flammable/explosive vapor-air mixture.
Oxidizing properties	: No data available
Explosion limits	: No data available

9.2. Other information

Additional information	: Ignition may occur at temperatures below those published in the literature as "autoignition" or "ignition" temperatures. Ignition temperatures decrease with increasing vapor volume and vapor/air contact time, and are influenced by pressure changes.
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SECTION 10: Stability and reactivity

10.1. Reactivity

Vapor has a very low autoignition temperature. (~ 220 °F (104 °C)). May ignite on hot surfaces at about this temperature or greater. Vapor burns rapidly in air. Reacts violently with water to form hydrogen chloride fumes.

10.2. Chemical stability

Stable under use and storage conditions as recommended below and in section 7.

10.3. Possibility of hazardous reactions

May occur.



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Trichlorosilane reacts violently with water to form hydrogen chloride fumes. Halocarbons react strongly with it, and the mixture may explode given a source of ignition. Under some conditions, the reaction of this product with acids or alkalis can release flammable hydrogen gas. Trichlorosilane is also a reducing agent that may react explosively with some oxidizing agents. Under the influence of heat or catalysts, such as amines, rust, or aluminum chloride, trichlorosilane may redistribute to form mixtures of silane, monochlorosilane, dichlorosilane, and silicon tetrachloride. These mixtures may be pyrophoric.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

Water, humidity. Oxidizing agent. Organic materials. Bases. Will react violently with the water in aqueous acid solutions. alkalis. Ketones. Aldehydes. It reacts rapidly (exothermically) with alcohols, primary and secondary amines, ammonia, and other compounds containing active hydrogen atoms.

10.6. Hazardous decomposition products

Thermal decomposition or burning can produce chlorine, hydrogen chloride, hydrogen, and oxides of silicon.

Trichlorosilane reacts violently with water to form hydrogen chloride fumes.

Halocarbons react strongly with it, and the mixture may explode given a source of ignition.

Under some conditions, the reaction of this product with acids or alkalis can release flammable hydrogen gas.

Trichlorosilane is also a reducing agent that may react explosively with some oxidizing agents.

Under the influence of heat or catalysts, such as amines, rust, or aluminum chloride, trichlorosilane may redistribute to form mixtures of silane, monochlorosilane, dichlorosilane, and silicon tetrachloride. These mixtures may be pyrophoric.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Oral: Harmful if swallowed.

Trichlorosilane (f)10025-78-2	
LD50 oral rat	1030 mg/kg
LC50 inhalation rat (ppm)	1040 ppm/1h
ATE US (oral)	1030.000 mg/kg body weight
ATE US (gases)	520.000 ppmV/4h

Skin corrosion/irritation : CAUSES SEVERE SKIN BURNS AND EYE DAMAGE.

Serious eye damage/irritation : Causes serious eye damage.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : May cause respiratory irritation.

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Harmful if swallowed.

Symptoms/injuries after inhalation : May cause respiratory irritation.

Symptoms/injuries after eye contact : Causes serious eye damage.

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Symptoms/injuries after ingestion : Swallowing a small quantity of this material will result in serious health hazard.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

Trichlorosilane (10025-78-2)

Persistence and degradability	Not established.
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12.3. Bioaccumulative potential

Trichlorosilane (10025-78-2)

Bioaccumulative potential	Not established.
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12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

Additional information : Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1295 Trichlorosilane, 4.3, I
 UN-No.(DOT) : UN1295
 Proper Shipping Name (DOT) : Trichlorosilane
 Class (DOT) : 4.3 - Class 4.3 - Dangerous when wet material 49 CFR 173.124
 Hazard labels (DOT) : 4.3 - Dangerous when wet
 3 - Flammable liquid
 8 - Corrosive



Packing group (DOT) : I - Great Danger
 DOT Special Provisions (49 CFR 172.102) : N34 - Aluminum construction materials are not authorized for any part of a packaging which is normally in contact with the hazardous material.
 T14 - 6 mm Prohibited 178.275(g)(3).
 TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: Degree of filling = $95 / (1 + a (tr - tf))$ Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: $a = (d15 - d50) / 35d50$ Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.
 TP7 - The vapor space must be purged of air by nitrogen or other means.
 TP13 - Self-contained breathing apparatus must be provided when this hazardous material is transported by sea.



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Additional information

Emergency Response Guide (ERG) Number : 139

Other information : No supplementary information available.

Transport by sea

UN-No. (IMDG) : 1295

Proper Shipping Name (IMDG) : TRICHLOROSILANE

Class (IMDG) : 4.3 - Substances which, in contact with water, emit flammable gases

Packing group (IMDG) : I - substances presenting high danger

Air transport

UN-No. (IATA) : 1295

Proper Shipping Name (IATA) : Trichlorosilane

Class (IATA) : 4.3 - Substances which in Contact with Water emit Flammable Gases

SECTION 15: Regulatory information

15.1. US Federal regulations

Trichlorosilane (10025-78-2)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Fire hazard Immediate (acute) health hazard Reactive hazard Sudden release of pressure hazard
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15.2. International regulations

CANADA

Trichlorosilane (10025-78-2)

Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

Trichlorosilane (10025-78-2)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Listed on ELINCS (European List of Notified Chemical Substances)

15.2.2. National regulations

Trichlorosilane (10025-78-2)

Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Japanese Poisonous and Deleterious Substances Control Law
Listed on the Canadian IDL (Ingredient Disclosure List)
Listed on INSQ (Mexican National Inventory of Chemical Substances)

15.3. US State regulations

Trichlorosilane(10025-78-2)

U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental	No

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Trichlorosilane(10025-78-2)	
Toxicity	
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information

: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc, it is the user's obligation to determine the conditions of safe use of the product.

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NFPA health hazard

: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard

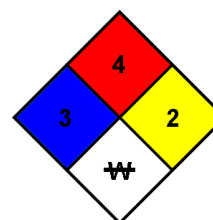
: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity

: 2 - Normally unstable and readily undergo violent decomposition but do not detonate. Also: may react violently with water or may form potentially explosive mixtures with water.

NFPA specific hazard

: W - Unusual reactivity with water. This indicates a potential hazard using water to fight a fire involving this material.





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HMIS III Rating

Health : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability : 4 Severe Hazard
Physical : 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.