Material Safety Data Sheet

Trichlorosilane
sc-224320

Hazard Alert Code Key:
- EXTREME
- HIGH
- MODERATE
- LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Trichlorosilane

STATEMENT OF HAZARDOUS NATURE

NFPA

SUPPLIER
Company: Santa Cruz Biotechnology, Inc.
Address: 2145 Delaware Ave
Santa Cruz, CA 95060
Telephone: 800.457.3801 or 831.457.3800
Emergency Tel: CHEMWATCH: From within the US and Canada: 877-715-9305
Emergency Tel: From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE
Intermediate in the production of silicones.

SYNONYMS
C13-H-Si, "silane, trichloro-", silici-chloroforme, siliciumchloroform, silicocloroform, trichloromonosilane, trichlorosilan, triclorosilano, "silylating agent"

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW
RISK
Spontaneously flammable in air.
Contact with water liberates toxic gas.
Causes severe burns.
Risk of serious damage to eyes.
Reacts violently with water liberating extremely flammable gases.
Harmful by inhalation and if swallowed.
Extremely flammable.

POTENTIAL HEALTH EFFECTS
ACUTE HEALTH EFFECTS
HAZARD RATINGS

inhalation of the mist will cause an inflammation of the upper and lower respiratory tract. Repeated or prolonged exposure to dilute solutions of HCl may cause dermatitis. Repeated exposures of animals to concentrations of about 34 ppm HCl to the nose and gums; and ulceration of the nasal mucous membranes. Chronic minor exposure to hydrogen chloride (HCl) vapour or fume may cause discolouration or erosion of the teeth, bleeding of the nose and gums; and ulceration of the nasal mucous membranes. Exposed repeated of animals to concentrations of about 34 ppm HCl produced no immediate toxic effects. Workers exposed to hydrogen chloride (HCl) vapour or fume may cause discolouration or erosion of the teeth, bleeding of the nose and gums; and ulceration of the nasal mucous membranes. Repeated inhalation of the mist will cause an inflammation of the upper and lower respiratory tract. Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS HAZARD RATINGS
Section 4 - FIRST AID MEASURES

SWALLOWED
- For advice, contact a Poisons Information Center or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Transport to hospital or doctor without delay.

EYE
- If this product comes in contact with the eyes:
  - Immediately hold eyelids apart and flush the eye continuously with running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
  - Transport to hospital or doctor without delay.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
- If skin or hair contact occurs:
  - Immediately flush body and clothes with large amounts of water, using safety shower if available.
  - Quickly remove all contaminated clothing, including footwear.
  - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Center.
  - Transport to hospital, or doctor.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN
- For acute or short term repeated exposures to strong acids:
  - Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
  - Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
  - Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
  - Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:
- Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- DO NOT attempt to neutralize the acid since exothermic reaction may extend the corrosive injury.
- Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- Charcoal has no place in acid management.
• Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:
• Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
• Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:
• Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. DO NOT use neutralizing agents or any other additives. Several liters of saline are required.
• Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
• Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

[Ellenhorn and Barceloux: Medical Toxicology].

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung edema often do not manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation is therefore essential. Immediate administration of an appropriate spray, by a doctor or a person authorized by him/her should be considered. (ICSC24419/24421.

### Section 5 - FIRE FIGHTING MEASURES

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<tr>
<td>Upper Explosive Limit (%):</td>
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<tr>
<td>Specific Gravity (water=1):</td>
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<td>Lower Explosive Limit (%):</td>
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### EXTINGUISHING MEDIA

**For chlorosilanes:**
• Foam is the most effective agent overall for use on chlorosilane fires. However, a number of variables, most notably the chlorosilane involved, the foam concentrate, the concentration of the foam, the expansion ratio (final foam volume versus initial solution volume), the application equipment and the fire conditions, can have a significant impact on the effectiveness of foam on chlorosilane fires. Certain combinations of these variables can in fact produce less than satisfactory (and even adverse) results.
• In general, though, alcohol-(polar) compatible AFFF (Aqueous Film Forming Foam) has proven to be an extremely effective foam type, and medium-expansion foam has been found to be the most effective foam expansion. Other foam types and expansions, however, can produce satisfactory results, especially on fires involving dimethylchlorosilane, trimethylchlorosilane and other heavily organic substituted chlorosilanes. For chlorosilanes containing Si-H (silicon-hydrogen) bonds, e.g., trichlorosilane and methylchlorosilane, alcohol-compatible AFFF and medium-expansion foam are highly recommended for maximum effectiveness.
• Since foam solutions contain water, reaction with the chlorosilane will normally be observed when foam is applied. Be aware that application of foam will release significant amounts of corrosive vapours. In addition, hydrogen vapours can be released from hydrogen-containing chlorosilanes and may be trapped under the foam blanket. Extreme care should be taken not to disturb the foam blanket during and after foam application.
• Other extinguishing agents that may be effective on small fires include dry sand and carbon dioxide.
• (Caution: When using carbon dioxide in enclosed spaces without adequate ventilation, an asphyxiation hazard can be created.

**Due to its reactivity with chlorosilanes,** water should NOT be used as an extinguishing agent for chlorosilane fires, except for very small fires. Water can also be used to protect exposures and personnel on the vapour cloud to disperse and dilute the HCl vapour. (Care should be taken, however, to prevent any over-spray or runoff from contacting the chlorosilane.)

**Sodium- and potassium-bicarbonate-based dry chemical fire extinguishers have proven effective to extinguish small chlorosilane fires,** except those involving hydrogen-containing chlorosilanes such as trichlorosilane and methylchlorosilane, where success has been marginal at best. Expect to use much larger quantities of dry chemical than would be required to extinguish a similar hydrocarbon fire. Dry chemical is generally not effective on large fires because an adequate amount of agent cannot be delivered quickly enough. Use of dry chemical on hydrogen-containing chlorosilanes will release hydrogen, which may ignite explosively.

**Prevent extinguishing agents from entering a container or vessel that contains chlorosilane.** The resulting release of hydrogen chloride vapours may over-pressurise the container or vessel, resulting in a sudden rupture of the container or vessel.

### FIRE FIGHTING

**Foam has proven to be the most effective extinguishing agent on chlorosilane fires.** When using foam, the following guidelines should be followed.

- **Apply foam as gently as possible.** DO NOT 'PLUNGE' OR AIM FOAM STREAMS DIRECTLY INTO A CHLOROSILANE.
- This will result in severe reactions between the chlorosilane and the water contained in the foam solution.
- **Wherever possible, aim foam streams in front of the chlorosilane or bounce off fixed objects (such as tanks or dike walls) to allow the foam to flow gently onto the liquid surface.** Occasionally, however, it may be necessary to "lob" foam in order to deliver foam to the centre of a fire.
- **Except in the case of very small fires, and where possible, use at least two nozzles to enhance distribution of the foam over the surface of the chlorosilane.**
- **Establish a relatively thick blanket of foam (e.g., 12 to 18 inches/30 - 50 cm minimum) over the entire liquid surface.** Once this has been done, temporarily suspend foam application to allow extinguishing to take place. Reapply foam when the intensity of the fire and/or the evolution of smoke/vapours appear to stabilise or even increase. Repeat this process as often as necessary until extinguishing is effected or until other emergency measures can be initiated.
- **It is theorised that the fire is extinguished through the gradual hydrolysis of the chlorosilane by the water draining from the foam.** This hydrolysis reaction forms a layer of siloxanes (fluid or gel) on the surface of the chlorosilane, which inhibits vapour production and excludes oxygen, thereby extinguishing the fire.
- **Exercise extreme caution when applying foam and when approaching the fire area.** The hydrolysis layer formed in the extinguishing process can trap flammable vapours, and, if this layer is disturbed (e.g. by impinging foam-streams), subsurface ignitions and rapid flashovers may occur.
- **Alert Emergency Responders and tell them location and nature of hazard.**
- **May be violently or explosively reactive.**
Wear full protective clothing plus breathing apparatus.
Prevent, by any means available, spillage from entering drains or water course.
Consider evacuation (or protect in place)
DO NOT use water on fires.
CAUTION: If only water available, use flooding quantities of water or withdraw personnel.
DO NOT allow water to enter containers.
DO NOT approach containers suspected to be hot.
Cool fire exposed containers with flooding quantities of water from a protected location until well after fire is out.
If safe to do so, remove undamaged containers from path of fire.
If fire gets out of control withdraw personnel and warn against entry.
Equipment should be thoroughly decontaminated after use.
Fight fire from a protected position or use unmanned hose holders or monitor nozzles.
Withdraw immediately in case of rising sound from venting safety devices or discolouration of tanks.
ALWAYS stay away from tank ends.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
■ May ignite on contact with air, moist air or water.
■ May react vigorously or explosively on contact with water.
■ May decompose explosively when heated or involved in fire.
■ May REIGNITE after fire is extinguished.
■ Gases generated after contact with water or moist air may be poisonous, corrosive or irritating.
■ Containers may explode on heating.
■ Runoff may create multiple fire or explosion hazard.
Combustion products include: carbon monoxide (CO), carbon dioxide (CO2), hydrogen chloride, phosgene, silicon dioxide (SiO2), other pyrolysis products typical of burning organic material.
Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

FIRE INCOMPATIBILITY
■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.
Keep dry
NOTE: May develop pressure in containers; open carefully. Vent periodically.

PERSONAL PROTECTION
Glasses:
Full face- shield.
Gloves:
Respirator:
Type AB-P Filter of sufficient capacity

MINOR SPILLS
■ Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
■ Check regularly for spills and leaks.
An accidental spill or release of chlorosilane results in a hydrogen chloride vapour fog, which should be minimised or controlled as quickly as possible.
■ Full protective equipment is needed for individuals who must work in a chlorosilane vapour cloud.
■ In the case of spills up to 5 litres, absorb the spill with dry inert absorbent material like dry sand, diatomaceous earth. The resulting material should then be properly packaged and its disposal should be supervised.
■ Note: this material will react with water and must carry an appropriate warning label.
■ Clear the affected area thoroughly with water.
■ Material from spill may be contaminated with water resulting in generation of gas which subsequently may pressure closed containers.
■ Hold spill material in vented containers only and plan for prompt disposal.
■ Eliminate all ignition sources.
■ Cover with DRY earth, sand or other non-combustible material.
■ Then cover with plastic sheet to minimize spreading and to prevent exposure to rain or other sources of water.
■ Use clean, non-sparking tools to collect absorbed material and place into loosely-covered metal or plastic containers ready for disposal.
■ Wear gloves and safety glasses as appropriate.

MAJOR SPILLS
■ Provide diking or other appropriate containment.
■ Cover spill with medium expansion foam (alcohol resistant).
■ Pump uncontaminated pure material into appropriate portable tanks, pressure cylinders or drums.
■ Neutralise residual material with alkali base. Caution! Hydrogen gas may be evolved during hydrolysis and neutralisation with some chlorosilanes (UN1183, UN1242, UN1295, UN2988). By-products of hydrolysis could be insoluble liquids or solids.
■ Hydrogen chloride vapours resulting from a large spill can be reduced by means of a water spray into the acid plume, being careful not to spray water directly into the spilled liquid chlorosilane pool. The resulting acidic waste water requires neutralisation prior to discharge to sewer systems.
■ In the event of accidental spillage of chlorosilanes to surface waters or to a municipal sewer system, promptly notify the appropriate pollution control agencies.

Chemical Class: acidic compounds, organic
For release onto land: recommended sorbents listed in order of priority.

<table>
<thead>
<tr>
<th>SORBENT TYPE</th>
<th>RANK</th>
<th>APPLICATION</th>
<th>COLLECTION</th>
<th>LIMITATIONS</th>
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</table>

Section 6 - ACCIDENTAL RELEASE MEASURES
**PROTECTIVE ACTIONS FOR SPILL**

**PROTECTIVE ACTION ZONE**

The protective action zone is defined as the area within which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confine the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

1. **SMALL SPILLS**
   - **Name**: Trichlorosilane (when spilled in water)
   - **Isolation Distance**: 100 ft (30 m)
   - **Downwind Day**: 0.1 mile (0.2 km)
   - **Protection Night**: 0.2 mile (0.3 km)

2. **LARGE SPILLS**
   - **Name**: Trichlorosilane (when spilled in water)
   - **Isolation Distance**: 400 ft (125 m)
   - **Downwind Day**: 0.8 mile (1.3 km)
   - **Protection Night**: 2 mile (3.2 km)

**FOOTNOTES**

1. **PROTECTIVE ACTION ZONE** is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confine the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2. **PROTECTIVE ACTIONS** should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3. **INITIAL ISOLATION ZONE** is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4. **SMALL SPILLS** involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered “small spills”. **LARGE SPILLS** involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a “one-tonne” compressed gas cylinder.


6. IERG information is derived from CANUTEC - Transport Canada.
### ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

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<th>Substance</th>
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<th>60 min</th>
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<td></td>
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<td>hydrogen chloride</td>
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<td>210</td>
<td>100</td>
<td>26</td>
<td>GALSYN~</td>
</tr>
</tbody>
</table>

**AEGL 1**: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

**AEGL 2**: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

**AEGL 3**: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

### EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing life-threatening health effects is:

- **trichlorosilane**: 25ppm

Irreversible or other serious effects or symptoms which could impair an individual’s ability to take protective action is:

- **trichlorosilane**: 3ppm

Other than mild, transient adverse effects without perceiving a clearly defined odour is:

- **trichlorosilane**: 1ppm

**American Industrial Hygiene Association (AIHA)**

Ingredients considered according exceed the following cutoffs:

- Very Toxic (T+) $> 0.1\%$
- Toxic (T) $> 3.0\%$
- R50 $> 0.25\%$ Corrosive (C) $> 5.0\%$
- R51 $> 2.5\%$
- else $> 10\%$

Where percentage is percentage of ingredient found in the mixture.

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**Section 7 - HANDLING AND STORAGE**

**PROCEDURE FOR HANDLING**

- DO NOT allow clothing wet with material to stay in contact with skin

For chlorosilanes:

- Static electricity discharges can ignite flammable chlorosilane vapour. It is important to "inert" the whole system, in which chlorosilanes are transferred, with dry nitrogen.
- Static electricity may be generated when any of these compounds flow through or are discharged from a pipe or fall freely through space. Splash filling is particularly hazardous and should be avoided.
- To drain off static charges and avoid spark discharges, a continuous path from the point of generation to ground must be provided. This is best accomplished by electrically interconnecting (bonding) all vessels and piping and grounding all vessels and piping.
- Equipment, such as lines, pumps, valves, vessels, etc., must be thoroughly dried with no trace of water remaining before introducing any chlorosilane.
- Prior to operation, the system should be tested for leaks at or above operating pressure with dry nitrogen and each joint painted with soap solution and checked for bubbles.
- Totally enclosed systems should be used. Atmospheric openings or vents will allow moisture to enter the system causing the generation of hydrogen chloride, which will attack the equipment.
- Use only dry nitrogen, when any of the following is performed: pressurising vessels, priming pumps, blanketing tanks, and filling or withdrawing of tank contents. Operational vents from nitrogen blanketing systems should be directed to a vent recovery system, or a vent scrubber or both.
- Before withdrawing chlorosilanes from drums, the drum must be electrically grounded and bonded to the receiving container. Chlorosilanes can be withdrawn through a steel valve installed in the drum bung. Dry nitrogen (air or oxygen must not be used due to the flammability of chlorosilanes) should be introduced into the drum through the other bung to
replace the volume of liquid. The nitrogen supply system should include a check valve, shut-off valve, pressure regulator and pressure relief valve. The system can be modified to withdraw chlorosilanes by gravity or to feed a pump. Application of pressure to a drum is not recommended.

Piping and Valves:
- Carbon steel piping is recommended.
- Welded and flanged piping connections are preferred in order to maintain a leak-tight system.
- Only flange gaskets which are stable to chlorosilanes (non-asbestos compressed materials, Teflon, graphite) must be used to provide a leak-tight joint. Spiral-wound metallic gaskets or metal/graphite gaskets are preferred when maximum fire resistance is desired.
- Valves of all sizes can be ductile iron, forged steel, or cast steel valves with stainless steel or steel trim.
- The interconnection of road / rail tank cars or portable tanks to permanent piping can be made with swing arm rotary joints (best solution) or seamless, braided flexible metal hose. Use flanged or union connections. Do not use quick disconnect couplings.

Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.
- Check for bulging containers.
- Vent periodically
- Always release caps or seals slowly to ensure slow dissipation of vapors
- Containers, even those that have been emptied, may contain explosive vapors.
- Do NOT cut, drill, grind or perform similar operations on or near containers.

RECOMMENDED STORAGE METHODS
- For chlorosilanes:
  - Non-ferrous metals and alloys such as aluminium, bronze, copper, zinc or magnesium should never be used. They are readily corroded and many, in case of fire, have low melting points.
  - Cast iron, due to its brittleness, must not be used to contain chlorosilanes; cast steel and forged steel can be used.
  - Plastics should not be used in chlorosilane service due to incompatibility and reactivity of this material.
  - In the absence of water, carbon steel is satisfactory for piping and other equipment used to contain chlorosilanes.
  - For low viscosity materials and solids: Drums and jerricans must be of the non-removable head type. Where a can is to be used as an inner package, the can must have a screwed enclosure. For materials with a viscosity of at least 2860 cSt. (23 deg. C):
    - Removable head packaging and
    - cans with friction closures may be used.

Where combination packages are used, there must be sufficient inert absorbent material to absorb completely any leakage that may occur, unless the outer packaging is a close fitting molded plastic box and the substances are not incompatible with the plastic. All combination packages for Packing group I and II must contain cushioning material.

STORAGE REQUIREMENTS
- Despite the chlorosilanes reactivity with water, water sprinkler systems are the most effective means of protecting buildings, equipment and building contents from chlorosilane fires. Foam-water sprinkler systems can also be used to provide additional extinguishing capabilities (such systems, however, are likely to have only limited effectiveness on trichlorosilane and methyldichlorosilane fires).
- In tank farms and other areas where spilled chlorosilanes would be relatively confined, a permanently installed medium-expansion foam system can be provided to extinguish any chlorosilane fires.
- An adequate number of hydrants and, where appropriate, monitor nozzles should be provided wherever chlorosilanes are stored, handled or processed.
- Of critical importance is the provision of adequate spill control facilities to safely drain away burning chlorosilanes and prevent other important areas and property from being exposed to the fire. This may include such features as diking, curbs, sloped surfaces, drainage trenches and remote impounding areas. Spill control facilities should be designed to accommodate the largest anticipated release of chlorosilanes as well as the quantity of water expected from fire fighting operations (including sprinkler systems, hoses, monitor nozzles, etc.).
- In closed buildings CO2 may be an adequate extinguishing medium.

Vessels:
- Generally storage tanks should be completely vacuum resistant or should be equipped with automatic pressure controlled nitrogen supply and shut down systems which avoid dangerous under-pressure.
- Design pressure is dependent on the properties of the chlorosilanes stored.
- Generally vessels should have emergency vents. Rain hats should be used over the ends of the vent pipe outlets.
- Vessels equipped with pressure-relief valves, to relieve excess internal pressure due to fire or other causes, should employ a non-fragmenting-type rupture disk ahead of or after the relief valve, precautions must be taken to prevent the valve from being blocked with hydrolysis products due to chlorosilane contact with moisture in air.

FOR TANKS:
- The tanks must be pressure vessels designed to an approved standard.
- The liquid inlet and outlet openings on the tanks must be provided with remote shut-off valves which close automatically in the event of fire.
- Precaution has been taken in the design and operation of the tanks to prevent the entry of moisture into the tanks.
- If two or more tanks are located in the same spill compound, the compound must be constructed so that any spillage is drained to a catchment area located at a sufficient distance from all tanks to ensure that the tanks will not be affected by a fire in the catchment area.
- The tanks and spill collection compounds should be at least 30 meters from tanks containing other dangerous goods where dangerous goods are stored or processed.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

X: Must not be stored together
### Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

#### EXPOSURE CONTROLS

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<th>Source</th>
<th>Material</th>
<th>TWA ppm</th>
<th>TWA mg/m³</th>
<th>STEL ppm</th>
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<th>Peak ppm</th>
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<td>trichlorosilane (Hydrogen chloride)</td>
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<tr>
<td>US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants</td>
<td>trichlorosilane (Hydrogen chloride)</td>
<td>(C)5 (C)7</td>
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<td>US - Alaska Limits for Air Contaminants</td>
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<td>Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances</td>
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<tr>
<td>Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits</td>
<td>trichlorosilane (Hydrogen chloride)</td>
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<tr>
<td>US - Oregon Permissible Exposure Limits (Z1)</td>
<td>trichlorosilane (Hydrogen chloride)</td>
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<tr>
<td>US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants</td>
<td>trichlorosilane (Hydrogen chloride)</td>
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<tr>
<td>Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)</td>
<td>trichlorosilane (Hydrogen chloride)</td>
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<td>US OSHA Permissible Exposure Levels (PELs) - Table Z1</td>
<td>trichlorosilane (Hydrogen chloride)</td>
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<tr>
<td>Canada - Northwest Territories Occupational Exposure Limits (English)</td>
<td>trichlorosilane (Hydrogen chloride)</td>
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<tr>
<td>Canada - Nova Scotia Occupational Exposure Limits</td>
<td>trichlorosilane (Hydrogen chloride)</td>
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</table>

*TLV Basis: upper respiratory tract irritation*
<table>
<thead>
<tr>
<th>Region / Location</th>
<th>Compound</th>
<th>TLV</th>
<th>Basis:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Canada - Prince Edward Island Occupational Exposure Limits</strong></td>
<td>trichlorosilane (Hydrogen chloride)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Canada - British Columbia Occupational Exposure Limits</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Canada - Ontario Occupational Exposure Limits</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>US - Minnesota Permissible Exposure Limits (PELs)</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
<td>5</td>
<td>7</td>
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<tr>
<td><strong>US ACGIH Threshold Limit Values (TLV)</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
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<tr>
<td><strong>US NIOSH Recommended Exposure Limits (RELs)</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
<td>5</td>
<td>7</td>
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<td><strong>Canada - Alberta Occupational Exposure Limits</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
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<td><strong>US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
<td>5</td>
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<tr>
<td><strong>US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
<td>(C)5</td>
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<td>hydrogen chloride (Hydrogen chloride; muriatic acid)</td>
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<tr>
<td><strong>US - Idaho - Limits for Air Contaminants</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
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</tr>
<tr>
<td><strong>US - Hawaii Air Contaminant Limits</strong></td>
<td>hydrogen chloride (Hydrogen chloride)</td>
<td>5</td>
<td>7</td>
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<td><strong>US - Alaska Limits for Air Contaminants</strong></td>
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<td><strong>Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances</strong></td>
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<tr>
<td><strong>US - Washington Permissible exposure limits of air contaminants</strong></td>
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<td>hydrogen chloride (Hydrogen chloride)</td>
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<td>7.5</td>
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<td>hydrogen chloride (Hydrogen chloride)</td>
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</table>
Canada - Prince Edward Island
Occupational Exposure Limits

**EMERGENCY EXPOSURE LIMITS**

<table>
<thead>
<tr>
<th>Material</th>
<th>Revised IDLH Value (mg/m³)</th>
<th>Revised IDLH Value (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>trichlorosilane</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>hydrogen chloride</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

**MATERIAL DATA**

**HYDROGEN CHLORIDE:**

- Odour Threshold Value: 0.262 ppm (detection), 10.06 ppm (recognition)
- NOTE: Detector tubes for hydrochloric acid, measuring in excess of 1 ppm, are available commercially.
- Hydrogen chloride is a strong irritant to the eyes, mucous membranes and skin. Chronic exposure produces a corrosive action on the teeth. Reports of respiratory irritation following short-term exposure at 5 ppm have lead to the recommended TLV-C. There is no indication that skin contact with hydrogen chloride elicits systemic poisoning and a skin designation has not been applied.
- Exposure of humans to hydrogen chloride at 50 to 100 ppm for 1 hour is reported to be barely tolerable; 35 ppm caused irritation of the throat on short exposure and 10 ppm was the maximal concentration for prolonged exposure. It has been stated that hydrogen chloride at concentrations of 5 ppm is immediately irritating.
- **Odour Safety Factor(OSF)**
  - OSF=1.3 (HYDROGEN CHLORIDE).

**TRICHLOROSILANE:**

- **No exposure limits set by NOHSC or ACGIH.**
- Exposure limits with "skin" notation indicate that vapor and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapor inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.
- OEL STEL (Russia): 1 mg/m³ Skin

**PERSONAL PROTECTION**

Consult your EHS staff for recommendations

**EYE**

- Chemical goggles.
- Full face shield.
- Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

**HANDS/FEET**

- Elbow length PVC gloves.
  - When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.
  - Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
    - frequency and duration of contact,
    - chemical resistance of glove material,
    - glove thickness and
    - dexterity
  - Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
  - When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
  - When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
  - Contaminated gloves should be replaced.
  - Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

**OTHER**

- For chlorosilanes:
  - Viton and similar synthetic rubbers afford the best protection
  - PVC and nitrile rubber may be used as a protective material (gloves, clothing and boots) for short term contacts in normal handling procedures to prevent skin burns.
  - Latex rubber should not be used.
  - The importance of water washing in the safety shower/eyewash for a minimum of 15 minutes after contact with chlorosilanes should be emphasised.
  - Contaminated clothing and shoes must be removed before the person is washed under the safety shower. The assistance by another person to help remove clothing and, perhaps, to help hold eyes open in the eyewash may be necessary.
  - Overalls.
  - Eyewash unit.
  - Barrier cream.
  - Skin cleansing cream.
  - Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

**RESPIRATOR**
- Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

<table>
<thead>
<tr>
<th>Breathing Zone Level ppm (volume)</th>
<th>Maximum Protection Factor</th>
<th>Half-face Respirator</th>
<th>Full-Face Respirator</th>
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<tbody>
<tr>
<td>1000</td>
<td>10</td>
<td>AB-1 P</td>
<td>-</td>
</tr>
<tr>
<td>1000</td>
<td>50</td>
<td>AB-1 P</td>
<td>-</td>
</tr>
<tr>
<td>5000</td>
<td>50</td>
<td>Airline*</td>
<td>-</td>
</tr>
<tr>
<td>5000</td>
<td>100</td>
<td>-</td>
<td>AB-2 P</td>
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<td>10000</td>
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<td>-</td>
<td>AB-3 P</td>
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<tr>
<td>100+</td>
<td>100</td>
<td>-</td>
<td>Airline* *</td>
</tr>
</tbody>
</table>

* - Continuous Flow  ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

**ENGINEERING CONTROLS**
- General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear an approved respirator.
- Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

<table>
<thead>
<tr>
<th>Type of Contaminant:</th>
<th>Air Speed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>solvent, vapors, degreasing etc., evaporating from tank (in still air)</td>
<td>0.25-0.5 m/s (50-100 f/min)</td>
</tr>
<tr>
<td>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyor transfers, welding, spray drift, platting acid fumes, pickling (released at low velocity into zone of active generation)</td>
<td>0.5-1 m/s (100-200 f/min.)</td>
</tr>
<tr>
<td>direct spray, spray painting in shallow booths, drum filling, conveyor loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td>
<td>1-2.5 m/s (200-500 f/min)</td>
</tr>
<tr>
<td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion)</td>
<td>2.5-10 m/s (500-2000 f/min.)</td>
</tr>
</tbody>
</table>

Within each range the appropriate value depends on:
- Lower end of the range: Room air currents minimal or favorable to capture
- Upper end of the range: Disturbing room air currents
- 1: Contaminants of low toxicity or of nuisance value only
- 2: Contaminants of high toxicity
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion
- 4: Small hood - local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

**Section 9 - PHYSICAL AND CHEMICAL PROPERTIES**

**PHYSICAL PROPERTIES**
- Liquid.
- Corrosive.
- Acid.
- Contact with water liberates toxic gas.

<table>
<thead>
<tr>
<th>State</th>
<th>Liquid</th>
<th>Molecular Weight</th>
<th>135.45</th>
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</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>Not available</td>
<td>Viscosity</td>
<td>Not Available</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>89.6</td>
<td>Solubility in water (g/L)</td>
<td>Reacts violently</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>-18.4</td>
<td>pH (1% solution)</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition Temp (°F)</td>
<td>Not Available</td>
<td>pH (as supplied)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition Temp (°F)</td>
<td>Not available</td>
<td>Vapour Pressure (mmHG)</td>
<td>Not available</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>90.5</td>
<td>Specific Gravity (water=1)</td>
<td>1.336</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>1.2</td>
<td>Relative Vapor Density (air=1)</td>
<td>&gt;1</td>
</tr>
<tr>
<td>Volatile Component (%vol)</td>
<td>Not available</td>
<td>Evaporation Rate</td>
<td>Not available</td>
</tr>
</tbody>
</table>
Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- May heat spontaneously
- Identify and remove sources of ignition and heating.
- Incompatible material, especially oxidizers, and/or other sources of oxygen may produce unstable product(s).
- Avoid sources of water contamination (e.g. rain water, moisture, high humidity).
- Avoid contact with oxygenated solvents/ reagents such as alcohols.

STORAGE INCOMPATIBILITY

- Trichlorosilane:
  - may ignite spontaneously in air
  - reacts violently with water, steam, alcohols evolving hydrogen chloride
  - reacts violently with strong oxidisers, ammonia
  - is incompatible with alkalis, strong acids, aliphatic amines, alkanolamines, isocyanates, alkylene oxides, epichlorohydrin, halogenated compounds, nitrogen oxides
  - corrodes common metals in presence of moisture producing hydrogen
  - Measurement of the autoignition temperatures of several series of mono-, di-, tri- and tetra- alkylsilanes showed the ease of oxidation decreases with increasing substitution.
  - Some alkylsilanes are easily ignited or are pyrophoric.

BRETHERICK L.: Handbook of Reactive Chemical Hazards.

- Avoid reaction with oxidizing agents.

NOTE: May develop pressure in containers; open carefully. Vent periodically.

Hydrogen chloride:

- reacts strongly with strong oxidisers (releasing chlorine gas), acetic anhydride, caesium cyanotridecayhydrodecaborate(2-), ethyldiene difluoride, hexafluoridesilicic acid, metal acrylate, sodium, silicon dioxide, tetralselenium tetrafluoride, and many organic materials
- is incompatible with aliphatic amines, alkanolamines, alkyne oxides, aluminium, aluminium-titanium alloys, aromatic amines, amidic, 2-aminoethanol, ammonia, ammonium hydroxide, calcium phosphate, chlorosulfonic acid, ethylenediamine, ethyleneimine, epichlorohydrin, isocyanates, metal acrylates, metal carbides, oleum, organic anhydrides, perchloric acid, 3-propiolactone, sulfuric acid, uranium phosphate, vinyl acetate, vinylidene fluoride
- attacks most metals forming flammable hydrogen gas, and some plastics, rubbers and coatings

- Segregate from alcohol, water.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

trichlorosilane

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

<table>
<thead>
<tr>
<th>TOXICITY</th>
<th>IRRITATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (rat) LD50: 1030 mg/kg</td>
<td>Nil Reported</td>
</tr>
<tr>
<td>Inhalation (rat) LCLo: 1000 ppm/4h</td>
<td></td>
</tr>
<tr>
<td>Inhalation (mouse) LC50: 1500 mg/m/2h</td>
<td></td>
</tr>
</tbody>
</table>

- Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

CARCINOGEN

<table>
<thead>
<tr>
<th>Hydrochloric acid</th>
<th>International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen chloride</td>
<td>US ACGIH Threshold Limit Values (TLV) - Carcinogens</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Carcinogen Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>A4</td>
</tr>
</tbody>
</table>

APPEARANCE

Colourless liquid; hydrolyses readily in water.
Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

HYDROGEN CHLORIDE:

TRICHLOROSILANE:

■ DO NOT discharge into sewer or waterways.

TRICHLOROSILANE:

■ For chlorosilanes:

The impact of chlorosilane on the environment is mainly in the air compartment. The acidic fumes will burn plants and trees that come in contact with it. The impact on the terrestrial environment is limited and local. Contaminated soil should be neutralised and sent for disposal.

Spills in the aquatic environment result in an increase in water acidity (because of the hydrochloric acid formation) which may harm aquatic life.

HYDROGEN CHLORIDE:

■ Although inorganic chloride ions are not normally considered toxic they can exist in effluents at acutely toxic levels (chloride >3000 mg/l), the resulting salinity can exceed the tolerances of most freshwater organisms.

Inorganic chlorine eventually finds its way into the aqueous compartment and as such is bioavailable. Incidental exposure to inorganic chloride may occur in occupational settings where chemicals management policies are improperly applied. The toxicity of chloride salts depends on the counter-ion (cation) present; that of chloride itself is unknown. Chloride toxicity has not been observed in humans except in the special case of impaired sodium chloride metabolism, e.g. in congestive heart failure.

Healthy individuals can tolerate the intake of large quantities of chloride provided that there is a concomitant intake of fresh water. Although excessive intake of drinking-water containing sodium chloride at concentrations above 2.5 g/litre has been reported to produce hypertension, this effect is believed to be related to the sodium ion concentration.

Chloride concentrations in excess of about 250 mg/litre can give rise to detectable taste in water, but the threshold depends upon the associated cations. Consumers can, however, become accustomed to concentrations in excess of 250 mg/litre. No health-based guideline value is proposed for chloride in drinking-water.

In humans, 88% of chloride is extracellular and contributes to the osmotic activity of body fluids. The electrolyte balance in the body is maintained by adjusting total dietary intake and by excretion via the kidneys and gastrointestinal tract. Chloride is almost completely absorbed in normal individuals, mostly from the proximal half of the small intestine. Normal fluid loss amounts to about 1.572 liters/day, together with about 4 g of chloride per day. Most (90 - 95%) is excreted in the urine, with minor amounts in faeces (4- %) and sweat (2%).

Chloride increases the electrical conductivity of water and thus increases its corrosivity. In metal pipes, chloride reacts with metal ions to form soluble salts thus increasing levels of metals in drinking-water. In lead pipes, a protective oxide layer is built up, but chloride enhances galvanic corrosion. It can also increase the rate of pitting corrosion of metal pipes.

Ecotoxicity

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Persistence: Water/Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>trichlorosilane</td>
<td>LOW</td>
<td>LOW</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
<tr>
<td>hydrogen chloride</td>
<td>LOW</td>
<td>LOW</td>
<td>HIGH</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Reactivity characteristic: use EPA hazardous waste number D003 (waste code R).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction,
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.
- Treat and neutralize at an approved treatment plant. Treatment should involve: Neutralization with soda-ash or soda-lime followed by: Burial in a licensed land-fill or Incineration in a licensed apparatus
- Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION
DOT:
Symbols: None
Identification Numbers: UN1295
PG: I
Label Codes: 4.3, 3, 8
Special provisions: N34, T14, TP2, TP7, TP13
Packaging: Exceptions: None
Packaging: Non-bulk: 201
Quantity Limitations: Cargo aircraft only: Forbidden
Vessel stowage: Location: D
Hazardous materials descriptions and proper shipping names:
Trichlorosilane
Air Transport IATA:
ICAO/IATA Class: 4.3 (3, 8)
UN/ID Number: 1295
Packing Group: -
Special provisions: None
Cargo Only
Packaging Instructions: Forbidden
Passenger and Cargo
Maximun Qty/Pack: Forbidden
Passenger and Cargo Limited Quantity
Passenger and Cargo Limited Quantity
Packing Instructions: -
Maximun Qty/Pack: -
Air transport may be forbidden if this material is flammable, corrosive or toxic gases may be released under normal conditions of transport.
Shipping Name: TRICHLOROSILANE
Maritime Transport IMDG:
IMDG Class: 4.3
UN Number: 1295
EMS Number: F-G-S-O
Limited Quantities: None
Shipping Name: TRICHLOROSILANE

Section 15 - REGULATORY INFORMATION

Trichlorosilane (CAS: 10025-78-2) is found on the following regulatory lists;

Hydrogen Chloride (CAS: 7647-01-0) is found on the following regulatory lists;
Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Skin contact may produce health damage.
- Cumulative effects may result following exposure.

*(limited evidence).

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- Classification of the mixture and its individual components has been drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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