



SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

Cl₃HSi 100 %

Issue Date:	06.08.2013	Version: 4.0	SDS No.: 000010021945
Revision Date:	07.12.2023		1/37
Last revised date :	08.04.2020		

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Cl₃HSi 100 %
 Trade name: Trichlorosilane 3.7

Additional identification

Chemical name: Trichlorosilane
 Chemical formula: Cl₃HSi
 INDEX No. 014-001-00-9
 CAS-No. 10025-78-2
 EC No. 233-042-5
 REACH Registration No. 01-2119494046-35

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

Identified uses: Industrial and professional use for chemical analysis, calibration, (routine) quality control, laboratory use. Under controlled conditions.
 Uses advised against: Contact supplier for more information on uses. Uses other than those listed above are not supported.

1.3 Details of the supplier of the safety data sheet

Supplier
 Linde Gas AS Telephone: +4723177200
 Postboks 13 Nydalen
 N-0409 Oslo
 E-mail: sds.ren@linde.com

1.4 Emergency telephone number: +47 22 59 13 00 (24h - Giftinformasjonssentralen)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.



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Physical Hazards

Flammable liquids Category 1 H224: Extremely flammable liquid and vapor.

Substances and mixtures, which in contact with water, emit flammable gases Category 1 H260: In contact with water releases flammable gases which may ignite spontaneously.

Substances and mixtures, which in contact with water, emit flammable gases Category 1 H260: In contact with water releases flammable gases which may ignite spontaneously.

Health Hazards

Acute toxicity (Inhalation - vapor) Category 3 H331: Toxic if inhaled.
 Acute toxicity (Inhalation - dust and mist) Category 3 H331: Toxic if inhaled.
 Acute toxicity (Oral) Category 4 H302: Harmful if swallowed.
 Skin corrosion Category 1 H314: Causes severe skin burns and eye damage.
 Serious eye damage Category 1 H318: Causes serious eye damage.

2.2 Label Elements

Contains: Trichlorosilane



Signal Word: Danger

Hazard Statement(s):
 H224: Extremely flammable liquid and vapor.
 H260: In contact with water releases flammable gases which may ignite spontaneously.
 H331: Toxic if inhaled.
 H302: Harmful if swallowed.
 H314: Causes severe skin burns and eye damage.



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Precautionary Statements

General

None.

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P231+P232: Handle and store contents under inert gas. Protect from moisture.
 P233: Keep container tightly closed.
 P260: Do not breathe dust/fume/gas/mist/vapors/spray.
 P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
 P334: Immerse in cool water [or wrap in wet bandages].
 P335: Brush off loose particles from skin.
 P310: Immediately call a POISON CENTER or doctor/ physician.
 P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P370 + P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:

P403+P233: Store in a well-ventilated place. Keep container tightly closed.

Disposal

None.

Supplemental information

EUH071: Corrosive to the respiratory tract.
 EUH014: Reacts violently with water.
 EUH029: Contact with water liberates toxic gas.

Unknown toxicity - Health

Acute toxicity, oral	0 %
Acute toxicity, dermal	100 %
Acute toxicity, inhalation, vapor	100 %
Acute toxicity, inhalation, dust or mist	100 %
Acute toxicity, inhalation, vapor	0 %



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Acute toxicity, inhalation, dust or mist 0 %

Unknown toxicity - Environment

Acute hazards to the aquatic environment 100 %

Chronic hazards to the aquatic environment 100 %

2.3 Other hazards

Endocrine disrupting properties-Toxicity

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Endocrine disrupting properties-Ecotoxicity

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.



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SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name Trichlorosilane
INDEX No.: 014-001-00-9
CAS-No.: 10025-78-2
EC No.: 233-042-5
REACH Registration No.: 01-2119494046-35
Purity: 100%
 The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.
Trade name: Trichlorosilane 3.7

Chemical name	Chemical formula	Concentration	CAS-No.	EC No.	REACH Registration No.	M-Factor:	Notes
Trichlorosilane	Cl ₃ HSi	100%	10025-78-2	233-042-5	01-2119494046-35	-	#

The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements. All concentrations are nominal.

This substance has workplace exposure limit(s).

This substance is listed as SVHC.PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

SECTION 4: First aid measures

General: Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: Move the exposed person to fresh air at once. If breathing stops, provide artificial respiration. Symptoms may include: Dizziness. Nausea, vomiting.



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Eye contact: Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately.

Ingestion: Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs. Get medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed: Causes severe skin burns and eye damage. May be fatal if swallowed. May be fatal if inhaled. Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other severe central nervous system effects.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Causes severe skin burns and eye damage. May be fatal if swallowed. May be fatal if inhaled. Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other severe central nervous system effects.

Treatment: Do not give direct mouth-to-mouth resuscitation if swallowed. To protect rescuer, use air-viva, oxy-viva or one-way mask. Resuscitate in a well-ventilated area. If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. Treat with a corticosteroid spray as soon as possible after inhalation. Get immediate medical advice/attention.

SECTION 5: Firefighting measures

General Fire Hazards: Heat may cause the containers to explode. USE WATER WITH CAUTION.

5.1 Extinguishing media

Suitable extinguishing media: Use water spray to reduce vapors or divert vapor cloud drift. Water Spray or Fog. Dry powder. Foam. Carbon Dioxide. Dry powder. Dry sand. Foam. Carbon Dioxide.

Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire. Water. Water Spray or Fog.



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5.2 Special hazards arising from the substance or mixture: Fire or excessive heat may produce hazardous decomposition products.

Hazardous Combustion Products: Silicon oxides Hydrogen chloride

5.3 Advice for firefighters

Special fire-fighting procedures: In case of fire: Stop leak if safe to do so. Use of water may result in the formation of very toxic aqueous solutions. Keep run-off water out of sewers and water sources. Dike for water control. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

Special protective equipment for fire-fighters: Gas tight chemically protective clothing (Type 1) in combination with self contained breathing apparatus.
Guideline: EN 943-2 Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Performance requirements for gas-tight (Type 1) chemical protective suits for emergency teams (ET)

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: Evacuate area. Provide adequate ventilation. Consider the risk of potentially explosive atmospheres . In case of leakage, eliminate all ignition sources. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

6.2 Environmental Precautions: Prevent further leakage or spillage if safe to do so. Reduce vapour with fog or fine water spray. Keep run-off water out of sewers and water sources. Dike for water control.

6.3 Methods and material for containment and cleaning up: Provide adequate ventilation. Eliminate sources of ignition. Wash contaminated equipment or sites of leaks with copious quantities of water.

6.4 Reference to other sections: Refer to sections 8 and 13.



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SECTION 7: Handling and storage:

7.1 Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Purge system with dry inert gas (e.g. helium or nitrogen) before product is introduced and when system is placed out of service. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Assess the risk of a potentially explosive atmosphere and the need for suitable equipment i.e. explosion-proof. Take precautionary measures against static discharges. Keep away from ignition sources (including static discharges). Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres. Use non-sparking tools. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure the complete system has been (or is regularly) checked for leaks before use. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Close container valve after each use and when empty, even if still connected to equipment.

7.2 Conditions for safe storage, including any incompatibilities: All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Segregate from oxidant gases and other oxidants being stored. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

7.3 Specific end use(s): None.



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SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

Chemical name	Type	Form of exposure	Exposure Limit Values	Source
trichlorosilane	TWA	as HCl	5 ppm 8 mg/m ³	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (12 2009)
	STEL	as HCl	10 ppm 15 mg/m ³	EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended (12 2009)

Please refer to the latest edition of the appropriate source text and consult an industrial hygienist or similar professional, or local agencies, for further information.

Biological Limit Values

No biological exposure limits noted for the ingredient(s).

DNEL-Values

Critical component	Type	Value	Remarks
Trichlorosilane	Workers - Inhalation, Systemic, long-term, Systemic, short-term		No hazard identified
	Workers - Inhalation, Local, long-term	9,9 mg/m ³	respiratory tract irritation
	Workers - Inhalation, Local, short-term	18,6 mg/m ³	respiratory tract irritation
	Workers - Dermal, Systemic, long-term, Systemic, short-term		No hazard identified
	Workers - Dermal, Local, long-term, Local, short-term		High hazard (no threshold derived), Skin irritation/corrosion
	Workers - Eyes		High hazard (no threshold derived)



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8.2 Exposure controls

Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Provide adequate general and local exhaust ventilation. Keep concentrations well below occupational exposure limits. Gas detectors should be used when toxic quantities may be released. Gas detectors should be used when quantities of flammable gases or vapours may be released. Systems under pressure should be regularly checked for leakages. Product to be handled in a closed system and under strictly controlled conditions. Only use permanent leak tight installations (e.g. welded pipes). Take precautionary measures against static discharges. Do not eat, drink or smoke when using the product.

Individual protection measures, such as personal protective equipment

General information:

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Keep suitable chemically resistant protective clothing readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Protect eyes, face and skin from contact with product. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Eye/face protection:

Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.



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Skin protection

Hand Protection:

Guideline: EN 388 Protective gloves against mechanical risks.
 Additional Information: Wear working gloves while handling containers
 Guideline: EN 374-1/2/3 Protective gloves against chemicals and micro-organisms.
 Additional Information: Chemically resistant gloves complying with EN 374 should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
 Material: Nitrile.
 Additional Information: Materials suitable for short-term contact and/or liquid splashes
 Material: Viton rubber (fluor rubber).
 Additional Information: Materials suitable for prolonged direct contact.
 Break-through time: 6 hrs

Body protection:

Wear fire resistant or flame retardant clothing. Wear acid-resistant protective clothing.
 Guideline: ISO/TR 2801:2007 Clothing for protection against heat and flame -- General recommendations for selection, care and use of protective clothing. Guideline: EN 14605 Protective clothing against liquid chemicals.

Other:

Wear safety shoes while handling containers
 Guideline: ISO 20345 Personal protective equipment - Safety footwear.

Respiratory Protection:

Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances. When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres

Guideline: EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking. Material: Filter B
 Guideline: EN 14387 Respiratory protective devices. Gas filter(s) and combined filter(s). Requirements, testing, marking.
 Guideline: EN 136 Respiratory protective devices. Full face masks. Requirements, testing, marking.



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Thermal hazards: No precautionary measures are necessary.

Hygiene measures: Obtain special instructions before use. Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

Environmental exposure controls: For waste disposal, see section 13 of the SDS.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state: liquid

Form: No data available.

Color: Colorless

Odor: Pungent

Odor Threshold: Odor threshold is subjective and is inadequate to warn of over exposure.

Freezing point: -195,7 °F / -126,5 °C Other, Key study 2 = reliable with restrictions

Boiling Point: 90 °F / 32 °C (1.013 hPa) Experimental result, Supporting study

Flammability: Flammable liquid

Upper/lower limit on flammability or explosive limits

Explosive limit - upper: 70 %(V) Experimental result, Supporting study

Explosive limit - lower: 6,9 %(V)

Flash Point: < -3,1 °F / < -19,5 °C (Closed Cup) 1 = reliable without restrictions

Autoignition Temperature: 224 °C Experimental result, Key study 2 = reliable with restrictions

Decomposition Temperature: Decomp at elevated temp to liberate hydrogen and deposit a high purity silicon, which leads to some of the principal uses of silanes.

pH: Not applicable

Viscosity

Dynamic viscosity: 0,332 mPa.s (68 °F / 20 °C) Experimental result, Key study

Kinematic viscosity: 0,23 mm²/s (77 °F / 25 °C) Experimental result, Supporting study



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Solubility(ies)

Solubility in Water:	Reacts violently with water.
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	Not known.
Dispersion Stability:	No data available.
Vapor pressure:	72.188 Pa (72,5 °F/22,5 °C) Experimental result, Key study
Relative density:	1,3417 (68 °F/20 °C)
Density:	1,34 g/cm ³ (68 °F/20 °C) Experimental result, Supporting study
Relative vapor density:	4,67 AIR=1
Particle characteristics:	Not applicable

9.2 Other information

Flammability:	Tci: 1
Evaporation Rate:	No data available.
Molecular weight:	135,47 g/mol (Cl ₃ HSi)
VOC Content:	EC Directive 2004/42: 1.000 g/l ~100 % (calculated) EU. Directive 2010/75/EU on Industrial Emissions (IPPC), Annex II, L 334/17: 0 % (calculated)

SECTION 10: Stability and reactivity

10.1 Reactivity:	No reactivity hazard other than the effects described in sub-section below.
10.2 Chemical Stability:	Stable under normal conditions.
10.3 Possibility of hazardous reactions:	Can form a potentially explosive atmosphere in air. May react violently with oxidants. Reacts with water.
10.4 Conditions to avoid:	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
10.5 Incompatible Materials:	Air and oxidizers. Reacts with water to form corrosive acids. With water causes rapid corrosion of some metals. For material compatibility see latest version of ISO-11114.



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10.6 Hazardous Decomposition Products: Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Silica dust (inert - but may irritate respiratory tract and eyes) Hydrogen chloride

SECTION 11: Toxicological information

General information: None.

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity - Oral Product Harmful if swallowed.
 Trichlorosilane LD 50 (Rat): 1.030 mg/kg Remarks: Experimental result, Key study

Acute toxicity - Dermal Product

Acute toxicity - Inhalation Product Toxic if inhaled.Toxic if inhaled.
 Trichlorosilane Vapour: LC 50 (Sprague-Dawley rat, Female, Male, 1 h): > 1000 ppm Remarks: Experimental result, Supporting study

Repeated dose toxicity Trichlorosilane NOAEL (Sprague-Dawley rat(Female, Male), Oral, 90 d): >= 2.000 mg/kg
 Experimental result, Key study

Skin Corrosion/Irritation Product Based on available data, the classification criteria are not met.

Serious Eye Damage/Eye Irritation Product Causes serious eye damage.



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Respiratory or Skin Sensitization

Product

Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity

Product

Based on available data, the classification criteria are not met.

In vitro

Trichlorosilane

In vitro gene mutations test on mammalian cells: (OECD Guideline 476 (In Vitro Mammalian Cell Gene Mutation Test)): Negative.

In vivo

Trichlorosilane

Micronucleus test in vivo mouse: (OECD Guideline 474 (Mammalian Erythrocyte Micronucleus Test)) Inhalation (Rat, Female): Negative.

Carcinogenicity

Product

Based on available data, the classification criteria are not met.

Reproductive toxicity

Product

Based on available data, the classification criteria are not met.

Reproductive toxicity (Fertility)

Trichlorosilane

Rat Oral NOAEL - No Observable Adverse Effect Level: 1.000 mg/kg bw/day

Developmental toxicity (Teratogenicity)

Trichlorosilane

Rat Oral

NOAEL - No Observable Adverse Effect Level: 1.000 mg/kg bw/day

Specific Target Organ Toxicity - Single Exposure

Product

Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure

Product

Based on available data, the classification criteria are not met.

Aspiration Hazard

Product

No data available.



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11.2 Information on other hazards

Endocrine disrupting properties

Product: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.;

Components:

Trichlorosilane The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.;

Other information

Product: No data available.

SECTION 12: Ecological information

General information: Not applicable

12.1 Toxicity

Acute toxicity

Product No ecological damage caused by this product.

Toxicity to microorganisms

Trichlorosilane Static EC 50 (Algae (*Pseudokirchneriella subcapitata*), 72 h): > 100 mg/l (OECD Guideline 201 (Freshwater Alga and Cyanobacteria, Growth Inhibition Test))

Toxicity to Aquatic Plants

Trichlorosilane EC50 (Alga, 72 h): > 100 mg/l

12.2 Persistence and Degradability

Product not relevant

Trichlorosilane Not readily biodegradable. Inorganic compound.



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12.3 Bioaccumulative potential

Product

Study not necessary due to exposure considerations.

12.4 Mobility in soil

Product

The substance has low mobility in soil.

12.5 Results of PBT and vPvB assessment

Product

Not classified as PBT or vPvB.

Other Ecological Information

May cause pH changes in aqueous ecological systems.

12.6 Endocrine disrupting properties:

Product:

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Components:

Trichlorosilane

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects:

Other hazards

Product:

No data available.

Other effects:



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SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Must not be discharged to atmosphere. Consult supplier for specific recommendations. Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Disposal methods: Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws. Gas may be scrubbed in alkaline solution under controlled conditions to avoid violent reaction. Toxic and corrosive gases formed during combustion should be scrubbed before discharge to atmosphere. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Gases formed by combustion should be washed with water to remove silica.

European Waste Codes

Container: 16 05 04*: Gases in pressure containers (including halons) containing hazardous substances.

SECTION 14: Transport information

ADR

- 14.1 UN number or ID number: UN 1295
- 14.2 UN Proper Shipping Name: TRICHLOROSILANE
- 14.3 Transport Hazard Class(es)
 - Class: 4.3
 - Label(s): 4.3, 3, 8
 - Hazard No. (ADR): X338
 - Tunnel restriction code: (B/E)
- 14.4 Packing Group: I
 - Limited quantity: None.
 - Excepted quantity: E0
- 14.5 Environmental hazards: Not applicable



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14.6 Special precautions for user: -

RID

14.1 UN number or ID number: UN 1295
 14.2 UN Proper Shipping Name TRICHLOROSILANE
 14.3 Transport Hazard Class(es)
 Class: 4.3
 Label(s): 4.3, 3, 8
 14.4 Packing Group: I
 Limited quantity None.
 Excepted quantity E0
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -

IMDG

14.1 UN number or ID number: UN 1295
 14.2 UN Proper Shipping Name: TRICHLOROSILANE
 14.3 Transport Hazard Class(es)
 Class: 4.3
 Label(s): 4.3, 8, 3
 EmS No.: F-G, S-0
 14.4 Packing Group: I
 Limited quantity None.
 Excepted quantity E0
 14.5 Environmental hazards: Not applicable
 14.6 Special precautions for user: -



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IATA

14.1 UN number or ID number:	UN 1295
14.2 Proper Shipping Name:	Trichlorosilane
14.3 Transport Hazard Class(es):	
Class:	4.3
Label(s):	-
14.4 Packing Group:	-
Limited quantity	None.
Excepted quantity	None.
14.5 Environmental hazards:	Not applicable
14.6 Special precautions for user:	-
Other information	
Passenger and cargo aircraft:	Forbidden.
Cargo aircraft only:	Forbidden.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Additional identification: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Ensure adequate air ventilation.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

EU Regulations

EU. REACH Annex XIV, Substances Subject to Authorization as amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as



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amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended: None present or none present in regulated quantities.

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

Chemical name	CAS-No.
Trichlorosilane	10025-78-2

EU. Directive 2012/18/EU (SEVESO III) on major accident hazards involving dangerous substances, Annex I:

Classification	Lower-tier Requirements	Upper-tier Requirements
P5a: Flammable liquids, Category 1; Flammable liquids Category 2 or 3 maintained at a temperature above their boiling point; Other liquids with a flash point ≤ 60 °C, maintained at a temperature above their boiling point	10 t	50 t
O1: Substances or mixtures with hazard statement EUH014	100 t	500 t
O3: Substances or mixtures with hazard statement EUH029	50 t	200 t

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:



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Chemical name	CAS-No.	Concentration
Trichlorosilane	10025-78-2	100%

National Regulations

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 2016/425/EEC on personal protective equipment Directive 2014/34/EU on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX) Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
This Safety Data Sheet has been produced to comply with Regulation (EU) 2020/878.

15.2 Chemical safety assessment: CSA has been carried out.

SECTION 16: Other information

Revision Information: Not relevant.

Abbreviations and acronyms:

ECTLV: EU. Indicative Occupational Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU, as amended
 ECTLV / STEL: Short Term Exposure Limit (STEL):
 ECTLV / TWA: Time Weighted Average (TWA):

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; EIGA - European Industrial Gases Association; ELx - Loading rate associated with x% response; Ems - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECS - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test

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population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - substance of very high concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Key literature references and sources for data:

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:

Agency for Toxic Substances and Diseases Registry (ATSDR)
(<http://www.atsdr.cdc.gov/>).

European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.

European Chemical Agency: Information on Registered Substances

<http://apps.echa.europa.eu/registered/registered-sub.aspx#search>

European Industrial Gases Association (EIGA) Doc. 169 "Classification and Labelling guide", as amended.

International Programme on Chemical Safety (<http://www.inchem.org/>)

ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.

Matheson Gas Data Book, 7th Edition.

National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.

The ESIS (European chemical Substances Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).

The European Chemical Industry Council (CEFIC) ERICards.

United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)

Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).

Substance specific information from suppliers.

Details given in this document are believed to be correct at the time of publication.



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Wording of the H-statements in section 2 and 3

H224	Extremely flammable liquid and vapor.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.

Training information: Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard.

Classification according to Regulation (EC) No 1272/2008 as amended.

Flam. Liq. 1, H224

Water-react. 1, H260

Acute Tox. 3, H331

Acute Tox. 3, H331

Water-react. 1, H260

Acute Tox. 4, H302

Skin Corr. 1, H314

Eye Dam. 1, H318

Other information: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Last revised date: 07.12.2023

Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.



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Annex to the extended Safety Data Sheet (eSDS)

Content

Exposure Scenario 1.	Industrial use, Formulation & (re)packing of substances and mixtures
Exposure Scenario 2.	Industrial use, Use for electronic component manufacture.

Exposure Scenario 1.

Exposure scenario worker

1. Industrial use, Formulation & (re)packing of substances and mixtures

List of use descriptors	
Sector(s) of use	
Product categories [PC]:	PC0: Other

Name of contributing environmental scenario and corresponding ERC	<u>Formulation & (re)packing of substances and mixtures:</u> ERC2: Formulation into mixture
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Contributing Scenarios	<u>Formulation & (re)packing of substances and mixtures:</u> PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
------------------------	--

2.1. Contributing exposure scenario controlling environmental exposure for: Formulation & (re)packing of substances and mixtures

Product characteristics

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Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 % (unless stated differently).
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Physical form of the product	Liquid
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Viscosity:	
Kinematic viscosity:	0,23 mm ² /s (68 °F/20 °C)
Dynamic viscosity:	0,332 mPa.s (68 °F/20 °C)

Amounts used

Regional use tonnage (tons/year):	No data available.
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Frequency and duration of use

Batch process:	not relevant
Continuous process:	260 Emission days

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

Other relevant operational conditions	not relevant
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Technical and organisational measures	Exhaust air scrubber
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Air	Air - minimum efficiency of 99 %
Soil	not relevant
Water	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	No data available
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	not relevant

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.



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Additional good practice advice beyond the REACH CSA

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Formulation & (re)packing of substances and mixtures

Process Categories:	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 % (unless stated differently).
Physical form of the product:	liquid
Vapour pressure:	72,188 Pa
Process temperature:	22,5 °C
Remarks	not relevant

Amounts used

Annual amount per site	No data available.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	> 240 min	5 days per week	PROC1, PROC8b

Human factors not influenced by risk management

Exposed skin areas:

Palm of one hand	240 cm ²
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Both hands	960 cm ²
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions:	240 cm ²
Transfer of substance or mixture (charging and discharging) at dedicated facilities:	960 cm ²

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Transfer of substance or mixture (charging and discharging) at dedicated facilities

Other relevant operational conditions:	Closed systems:
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour): 95 %				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions



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Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour): 95 %				Transfer of substance or mixture (charging and discharging) at dedicated facilities
Local exhaust ventilation: 95 %				Transfer of substance or mixture (charging and discharging) at dedicated facilities

Organisational measures to prevent/limit releases, dispersion and exposure

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Wear a full face respirator conforming to EN136.: 95 %	Wear protective gloves/protective clothing.: 95 %	Wear eye protection/face protection.: 100 %	Not applicable	See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

This information is not available.



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3. Exposure estimation

Environment:

Formulation & (re)packing of substances and mixtures:

none

Health:

Formulation & (re)packing of substances and mixtures:

none

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 2.

Exposure scenario worker

1. Industrial use, Use for electronic component manufacture.

List of use descriptors	
Sector(s) of use	SU16: Manufacture of computer, electronic and optical products, electrical equipment
Product categories [PC]:	PC33: Semiconductors
Name of contributing environmental scenario and corresponding ERC	<u>Use for electronic component manufacture.:</u> ERC6a: Use of intermediate
Contributing Scenarios	<u>Use for electronic component manufacture.:</u> PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions



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2.1. Contributing exposure scenario controlling environmental exposure for: Use for electronic component manufacture.

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 % (unless stated differently).
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Physical form of the product	Liquid
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Viscosity:	
Kinematic viscosity:	0,23 mm ² /s (68 °F/20 °C)
Dynamic viscosity:	0,332 mPa.s (68 °F/20 °C)

Amounts used

Regional use tonnage (tons/year):	No data available.
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Frequency and duration of use

Batch process:	260 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

Other relevant operational conditions	not relevant
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Risk management measures (RMM)



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Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Technical and organisational measures	Exhaust air scrubber
Air	Air - minimum efficiency of 99 %
Soil	not relevant
Water	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	No data available
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	not relevant

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste



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Revision Date:	07.12.2023		34/37
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Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice beyond the REACH CSA

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Use for electronic component manufacture.

Process Categories:	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 % (unless stated differently).
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Physical form of the product:	liquid
Vapour pressure:	72,188 Pa
Process temperature:	22,5 °C
Remarks	not relevant

Amounts used

Annual amount per site	No data available.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	> 240 min	5 days per week	PROC1



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Human factors not influenced by risk management

Exposed skin areas:

Palm of one hand	240 cm ²
Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions:	240 cm ²

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Other relevant operational conditions: Closed systems:

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour): 95 %				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions



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Organisational measures to prevent/limit releases, dispersion and exposure

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Wear a full face respirator conforming to EN136.: 95 %	Wear protective gloves/protective clothing.: 95 %	Wear eye protection/face protection.: 100 %	Not applicable	See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

This information is not available.

3. Exposure estimation

Environment:

Use for electronic component manufacture.:

none

Health:

Use for electronic component manufacture.:

none



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4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>