

SILQUEST* A-187 SILANE

SAFETY DATA SHEET

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by Regulation (EU) No. 2015/830

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

1.1 Product identifier

Product name: SILQUEST* A-187 SILANE

INDEX No. Not applicable
CAS-No. 2530-83-8
EC No. 219-784-2

REACH Registration No. 01-2119513212-58-0001

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

Identified uses: For industrial use only.

Uses advised against: Not known.

1.3 Details of the supplier of the safety data sheet

Manufacturer/Importer/Distributor Information : Momentive Performance Materials GmbH
Chempark Leverkusen Gebaeude V7
DE - 51368 Leverkusen
Germany

Contact person : MomentiveEMEA.productsteward@momentive.com

Telephone : General information
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1.4

Emergency telephone number : Europe, Israel & All other: +44 (0) 1235239670; Middle East: +44 (0) 1235239671

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has been classified according to the legislation in force.

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

Health Hazards

Serious eye damage Category 1 H318: Causes serious eye damage.

2.2 Label Elements

Contains: 3-glycidyl-oxypropyl-trimethoxy-silane
3-glycidyl-oxypropyl-trimethoxy-silane



Signal Words: Danger

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Hazard Statement(s): H318: Causes serious eye damage.

Precautionary Statements

Prevention: P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response: P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER/doctor.

Unknown toxicity - Health

Acute toxicity, oral	0,086 %
Acute toxicity, dermal	0,086 %
Acute toxicity, inhalation, vapor	0,086 %
Acute toxicity, inhalation, dust or mist	0,086 %

Additional Information: No data available.

2.3 Other hazards No data available.

SECTION 3: Composition/information on ingredients

Chemical nature: Gamma-Glycidoxypropyltrimethoxysilane

3.1 Substances

General information: No data available.
Chemical name Oxirane, 2-[[3-(trimethoxysilyl)propoxy]methyl]-
INDEX No.: Not applicable
CAS-No.: 2530-83-8
EC No.: 219-784-2
REACH Registration No.: 01-2119513212-58-0001
M-Factor: No data available.

Chemical name	Concentration	CAS-No.	EC No.	REACH Registration No.	M-Factor:	Notes
3-glycidyl-oxypentyl-trimethoxy-silane	50 - <100%	2530-83-8	219-784-2	01-2119513212-58-0001	No data available.	

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

This substance has workplace exposure limit(s).

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

SECTION 4: First aid measures

General: Move into fresh air and keep at rest. Get medical attention immediately.

4.1 Description of first aid measures

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Inhalation:	Move the exposed person to fresh air at once. If respiratory problems, artificial respiration/oxygen. Call a physician or poison control center immediately.
Eye contact:	Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.
Skin Contact:	Wash off promptly and flush contaminated skin with water. Promptly remove clothing if soaked through and flush skin with water. Wash contaminated clothing before reuse. Get medical attention.
Ingestion:	If conscious, drink plenty of water. Do not induce vomiting. Call a physician or poison control center immediately.
4.2 Most important symptoms and effects, both acute and delayed:	Product may hydrolyse upon contact with body fluids in the gastrointestinal tract to produce additional methanol; therefore, consider the signs/symptoms of methanol poisoning and also observe the known latency period of several days!
4.3 Indication of any immediate medical attention and special treatment needed	
Hazards:	No data available.
Treatment:	Get medical attention immediately.

SECTION 5: Firefighting measures

General Fire Hazards:	Do not use water jet as an extinguisher, as this will spread the fire. Use water spray to keep fire-exposed containers cool.
5.1 Extinguishing media	
Suitable extinguishing media:	Alcohol resistant foam. Carbon dioxide Dry chemical.
Unsuitable extinguishing media:	Avoid water in straight hose stream; will scatter and spread fire.
5.2 Special hazards arising from the substance or mixture:	In case of fire, carbon monoxide and carbon dioxide may be formed.
5.3 Advice for firefighters	
Special fire fighting procedures:	All equipment used when handling the product must be grounded.
Special protective equipment for fire-fighters:	Wear self-contained breathing apparatus and protective clothing.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:	Avoid contact with eyes, skin, and clothing. Avoid contact with liquid and vapors. Use personal protective equipment. Use only in well-ventilated areas.
6.2 Environmental Precautions:	Do not allow runoff to sewer, waterway or ground.
6.3 Methods and material for containment and cleaning up:	Absorb spillage with suitable absorbent material. Shovel up and place in a container for salvage or disposal.

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6.4 Reference to other sections:

Remove sources of ignition. In case of spills, beware of slippery floors and surfaces. See Section 8 of the SDS for Personal Protective Equipment. Collect and dispose of spillage as indicated in section 13 of the SDS.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling:

Do not taste or swallow. Avoid contact with eyes, skin, and clothing. Wash hands after handling. Provide adequate ventilation. Avoid inhalation of dust and vapors.

Storage conditions:

Keep container tightly closed. Keep away from sources of ignition - No smoking.

7.2 Conditions for safe storage, including any incompatibilities:

Keep container tightly closed. Purge opened containers with bone dry inert gas before resealing.

Storage Stability:

No data available.

7.3 Specific end use(s):

No data available.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

Biological Limit Values

None.

8.2 Exposure controls

Appropriate Engineering Controls:

Provide eyewash station and safety shower. General (mechanical) room ventilation is expected to be satisfactory if handled at low temperatures or in covered equipment. Provide adequate ventilation if fumes or vapors are generated.

Individual protection measures, such as personal protective equipment

General information:

Use only in well-ventilated areas. Do not eat, drink or smoke when using the product. Wash hands after handling. Practice good housekeeping.

Eye/face protection:

Safety glasses with side-shields conforming to EN166

Skin protection

Hand Protection:

Advice: This recommendation is valid only for our Product as delivered. If this product will be mixed with other substances you need to contact a supplier of CE approved protective gloves (e.g. KCL GmbH, D-36124 Eichenzell, Tel. 0049 (0) 6659 87300, Fax. 0049 (0) 6659 87155, email: vertrieb@kcl.de).

Material: 898 Butoject

Minimum break through time: 480 min

Glove thickness: 0,7 mm

Guideline: EN 374

Other:

Wear suitable protective clothing.

Respiratory Protection:

In case of inadequate ventilation: Respiratory protection mask with Filtertype ABEK

Hygiene measures:

No data available.

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Environmental exposure controls:

No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state:	liquid
Form:	liquid
Color:	Colorless
Odor:	ester like
Odor Threshold:	
pH:	No data available.
Freezing point:	< -70 °C
Boiling Point:	290 °C (1.013 hPa)
Flash Point:	110 °C (ASTM D 93)
Evaporation Rate:	< 1
Flammability (solid, gas):	This product is not flammable.
Flammability Limit - Upper (%):	No data available.
Flammability Limit - Lower (%):	No data available.
Vapor pressure:	calculated 0,011 hPa (20 °C)
Vapor density (air=1):	No data available.
Density:	1,07 g/cm ³ (20 °C)
Relative density:	No data available.
Solubility(ies)	
Solubility in Water:	estimated 36,5 g/l (20 °C) hydrolyses
Solubility (other):	No data available.
Partition coefficient (n-octanol/water) Log Pow:	calculated 0,5
Autoignition Temperature:	400 °C
Decomposition Temperature:	No decomposition if stored and applied as directed.
SADT:	No data available.
Viscosity, dynamic:	calculated 2,9 mPa·s (20 °C)
Viscosity, kinematic:	calculated 2,7 mm ² /s (20 °C)
Explosive properties:	Not classified
Oxidizing properties:	No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity: No data available.

10.2 Chemical Stability: Material is stable under normal conditions.

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10.3 Possibility of hazardous reactions:

POLYMERIZATION - HYDROLYSIS The epoxysilane esters are not monomers in the usual sense, but polymeric materials may be produced under certain conditions of catalyzed partial hydrolysis. Polysiloxanes are produced by polymerization of the silyl ester group in the presence of controlled amounts of water and alkali or acid catalyst at ambient temperatures. At slightly higher temperatures (ca. 50 °C), polyglycols or polyglycol ethers are produced via the epoxy functional group under the same conditions of water concentration and alkali or acid catalyst. In as much as both of these reactions are exothermic and may occur simultaneously, the heat evolved may be cumulative and greatly accelerate the rate of reactions. It is imperative, therefore, that unintentional contamination of the epoxysilane esters with water be avoided, and that intentional hydrolysis be properly controlled to avoid hazardous consequences.

10.4 Conditions to avoid:

Avoid contact with: Ignition sources.

10.5 Incompatible Materials:

Reacts with water or moisture to form: Methanol

10.6 Hazardous Decomposition Products:

Hazardous Decomposition Products Carbon oxides Oxides of silicon.

SECTION 11: Toxicological information

General information:

Product may hydrolyze upon contact with body fluids in the gastrointestinal tract to produce additional methanol. The potential for toxic effects due to methanol formation (eye damage and blindness, metabolic acidosis, dizziness and drowsiness, fetal toxicity, and liver, kidney, and heart muscle damage) should be recognized.

Information on likely routes of exposure

Inhalation:

No data available.

Ingestion:

No data available.

Skin Contact:

No data available.

Eye contact:

No data available.

11.1 Information on toxicological effects

Acute toxicity

Oral

Product:

Not classified for acute toxicity based on available data.

Specified substance(s)

3-glycidyl-oxypropyl-trimethoxy-silane

LD 50 (Rat): 8.025 mg/kg

Dermal

Product:

Not classified for acute toxicity based on available data.

Specified substance(s)

3-glycidyl-oxypropyl-trimethoxy-silane

LD 50 (Rabbit): 4,250 mg/kg

Inhalation

Product:

Not classified for acute toxicity based on available data.

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Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	LC50 (Rat, 4 h): > 5,3 mg/l
Repeated dose toxicity Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	No data available.
Skin Corrosion/Irritation: Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	No data available.
Serious Eye Damage/Eye Irritation: Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	No data available.
Respiratory or Skin Sensitization: Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	Human patch test: negative Bühler-Patch-Test skin sensitisation on guinea pigs, OECD-Guideline 406 (Skin Sensitisation) (Guinea Pig): negative
Germ Cell Mutagenicity	
In vitro Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	No data available.
In vivo Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	No data available.
Carcinogenicity Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	No data available.
Reproductive toxicity Product:	No data available.
Specified substance(s) 3-glycidyl-oxypropyl-trimethoxy-silane	No data available.

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Specific Target Organ Toxicity - Single Exposure

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-
trimethoxy-silane No data available.

Specific Target Organ Toxicity - Repeated Exposure

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-
trimethoxy-silane No data available.

Aspiration Hazard

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-
trimethoxy-silane No data available.

Other effects: No data available.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity

Fish

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-
trimethoxy-silane No data available.

Aquatic Invertebrates

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-
trimethoxy-silane No data available.

Chronic Toxicity

Fish

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-
trimethoxy-silane No data available.

Aquatic Invertebrates

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-
trimethoxy-silane No data available.

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Toxicity to Aquatic Plants

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-trimethoxy-silane No data available.

12.2 Persistence and Degradability

Biodegradation

Product: The product is not readily biodegradable.

Specified substance(s)

3-glycidyl-oxypropyl-trimethoxy-silane No data available.

BOD/COD Ratio

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-trimethoxy-silane No data available.

12.3 Bioaccumulative potential

Product: No data available.

Specified substance(s)

3-glycidyl-oxypropyl-trimethoxy-silane No data available.

12.4 Mobility in soil:

No data available.

Known or predicted distribution to environmental compartments

3-glycidyl-oxypropyl-trimethoxy-silane No data available.

12.5 Results of PBT and vPvB assessment:

No data available.

3-glycidyl-oxypropyl-trimethoxy-silane

No data available.

12.6 Other adverse effects:

No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information:

See Section 8 for information on appropriate personal protective equipment. The generation of waste should be avoided or minimized wherever possible. Do not discharge into drains, water courses or onto the ground.

Disposal methods:

Can be incinerated when in compliance with local regulations.

SECTION 14: Transport information

ADR

Not regulated.

ADN

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Not regulated.

RID

Not regulated.

IMDG

Not regulated.

IATA

Not regulated.

14.6 Special precautions for user: This product is not regarded as dangerous goods according to the national and international regulations on the transport of dangerous goods. Keep away from food, drink and animal feeding stuffs.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code:

Not applicable

SECTION 15: Regulatory information

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

EU Regulations

Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer: none

Regulation (EC) No. 850/2004 on persistent organic pollutants: none

Regulation (EC) No. 649/2012 Import and export of dangerous chemicals: none

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended: none

EU. REACH Candidate List of Substances of Very High Concern for Authorization (SVHC): none

EU. REACH Candidate List of Substances of Very High Concern for Authorization (SVHC): none

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use: none

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.: none

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.: none

Directive 96/82/EC (Seveso III): on the control of major accident hazards involving dangerous substances: none

EU. Regulation No. 166/2006 PRTR (Pollutant Release and Transfer Registry), Annex II: Pollutants: none

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Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:
none

15.2 Chemical safety assessment:

A Chemical Safety Assessment has been performed on this substance.

Inventory Status

Australia AICS:	On or in compliance with the inventory	Remarks: None.
Canada DSL Inventory List:	On or in compliance with the inventory	Remarks: None.
EINECS, ELINCS or NLP:	On or in compliance with the inventory	Remarks: None.
Japan (ENCS) List:	On or in compliance with the inventory	Remarks: None.
China Inv. Existing Chemical Substances:	On or in compliance with the inventory	Remarks: None.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory	Remarks: None.
Canada NDSL Inventory:	Not in compliance with the inventory.	Remarks: None.
Philippines PICCS:	On or in compliance with the inventory	Remarks: None.
US TSCA Inventory:	On or in compliance with the inventory	Remarks: None.
New Zealand Inventory of Chemicals:	On or in compliance with the inventory	Remarks: None.
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory	Remarks: None.
REACH:	If purchased from Momentive Performance Materials GmbH in Leverkusen, Germany, all substances in this product have been registered by Momentive Performance Materials GmbH or upstream in our supply chain or are exempt from registration under Regulation (EC) No 1907/2006 (REACH). For polymers, this includes the constituent monomers and other reactants.	Remarks: None.

SECTION 16: Other information

Revision Information: Not relevant.

Key literature references and sources for data: No data available.

Wording of the H-statements in section 2 and 3

H318 Causes serious eye damage.

H318 Causes serious eye damage.

Training information: No data available.

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

Eye Dam. 1, H318

SILQUEST* A-187 SILANE**Issue Date:** 21.08.2018**Disclaimer:****Notice to reader**

Unless otherwise specified in section 1.2, Momentive Products are intended for industrial application only.

They are not intended for specific medical applications, neither for long-lasting (> 30 days) implantation into the human body, injected or directly ingested, nor for the manufacture of multiple usable contraceptives.

Further Information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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Annex to the extended Safety Data Sheet (eSDS)**Content**

Exposure Scenario I.	Manufacture of substance
Exposure Scenario II.	Use as an intermediate
Exposure Scenario III.	Use as a monomer
Exposure Scenario IV.	Formulation of:, Coatings
Exposure Scenario V.	Use of coatings (e.g. beverage cans)
Exposure Scenario VI.	Use of coatings (e.g. automotive refinishing)
Exposure Scenario VII.	Professional use, Coatings
Exposure Scenario VIII.	Consumer use, Coatings
Exposure Scenario IX.	Formulation of:, Non-metal, Surface treatment, Use in non-metal surface treatment.
Exposure Scenario X.	Use in non-metal surface treatment., In situ treatment
Exposure Scenario XI.	Formulation of sealants.
Exposure Scenario XII.	Industrial use of sealants.
Exposure Scenario XIII.	Professional use of sealants.
Exposure Scenario XIV.	Consumer use, Sealants
Exposure Scenario XV.	Use as laboratory reagent
Exposure Scenario XVI.	Textiles
Exposure Scenario	Manufacture of silicon wafers for semiconductors industry,

XVII.	SILQUEST* A-187 SILANE
Exposure Scenario	including photovoltaics, Manufacture of, Electronics
XVIII.	Professional use, Methanol, Exposure to substances released during end-use of products
Exposure Scenario XIX.	Consumer use, Methanol, Exposure to substances released during end-use of products

Exposure Scenario I.

Exposure Scenario worker

1.Manufacture of substance

List of use descriptors	
Sector(s) of use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU19: Building and construction work
Product categories [PC]:	PC19: Intermediate (precursor) PC9a: Coatings and paints, thinners, paint removers PC1: Adhesives, sealants
Name of contributing environmental scenario and corresponding ERC	<u>Manufacture of substance:</u> ERC1: Manufacture of the substance ERC2: Formulation into mixture (mixtures) ERC6a: Use of intermediate ERC6c: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
List of names of contributing worker scenarios and corresponding PROCs	<u>Manufacture of substance:</u> PROC1: Use in closed process, no likelihood of exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

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	PROC5: Mixing or blending in batch processes PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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2.1. Contributing exposure scenario controlling environmental exposure for: Manufacture of substance

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	3.600 tonnes/year
Daily amount per site	10.286 kg/day Manufacturing
Daily amount per site	514 kg/day Formulation

Frequency and duration of use

Batch process:	not relevant
Continuous process:	350 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	not relevant
Local freshwater dilution factor	900
Local marine water dilution factor	1.000
Flow rate:	1170 x1000 m ³ /d Fresh water
Flow rate:	3100 x1000 m ³ /d Marine water

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Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	350	0,001 %	-	-	Production
Continuous release	350	0,25 %	-	0,5 %	Formulation

Other relevant operational conditions not relevant

Risk management measures (RMM)

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

See section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):

type:	municipal
Discharge rate:	1.300 m3/d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
Measures to limit air emissions:	not relevant
Remarks:	Fresh water

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Size of municipal sewage system/treatment plant (m³/d):

type:	municipal
Discharge rate:	3.100 m ³ /d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
Measures to limit air emissions:	not relevant
Remarks:	Marine water

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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

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2.2. Contributing exposure scenario controlling worker exposure for: Manufacture of substance

Process Categories:	PROC1: Use in closed process, no likelihood of exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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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:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	10.286 kg Production
Maximum daily site tonnage (kg/day):	514 kg Formulation

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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	15 - 60 min	1 Exposure time per day	PROC1, PROC2, PROC3, PROC4, PROC5
Exposure time	< 15 min	5 Exposure time per day	PROC8b, PROC9

Human factors not influenced by risk management

Exposed skin areas:

Palm of one hand	240 cm ² PROC1 PROC3
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Palm of both hands	480 cm ² PROC2 PROC4 PROC5 PROC8b PROC9
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:		Highly controlled conditions		All relevant Process Categories
	Inhalation	with local exhaust ventilation	97 %	PROC8b
	Inhalation	with local exhaust ventilation	90 %	PROC2, PROC3, PROC4, PROC5, PROC9

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Inhalation, Dermal	Specific workers training in use of personal protective equipment, Process safety assessment, General Standard Operating Procedures which control routine activities, Use a 'permit to work' system for maintenance of tanks and silos., Flushing, purging and venting of vessel lines are implemented before cleaning or maintenance, Plant integrity checks, Operator monitoring, Safety and environmental audits, Regular training of workers with respect to substance hazards and safe handling, Fully trained chemical operators, EMAS/ISO14001, Integrated safety management systems	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation, Dermal	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	95 %	All relevant Process Categories
	Dermal	Wear suitable protective clothing., Wear closed protection glasses., Wear face protective shield.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be		All relevant Process Categories

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		worn., Respiratory protection mask with Filtertype ABEK		
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Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Manufacture of substance:

ERC1:

Compartment			Method	Remarks
Sewage treatment plant	1,62 mg/l	< 0,162	EUSES	
Fresh water	4,15 µg/l	0,00415	EUSES	
freshwater sediment	3,29 µg/kg wwt	0,00416	EUSES	
Saltwater	0,869 µg/l	0,000869	EUSES	
Saltwater Sediment	0,689 µg/kg wwt	0,000872	EUSES	
Soil	2,75 µg/kg wwt	0,0212	EUSES	

SILQUEST* A-187 SILANE

Health:

Manufacture of substance:

PROC1:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, including modification factor for exposure duration	0,019 mg/m ³	0,000129	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,017 mg/kg bw/day	0,000810	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,000939	ECETOC TRA worker v3	none

PROC2:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,19 mg/m ³	0,001293	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for	0,014 mg/kg bw/day	0,000667	ECETOC TRA worker v3	none

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	use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,001959	ECETOC TRA worker v3	none

PROC3:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,58 mg/m ³	0,003946	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,0017 mg/kg bw/day	0,000081	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,004027	ECETOC TRA worker v3	none

PROC4:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,96 mg/m ³	0,006531	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including	0,035 mg/kg bw/day	0,001667	ECETOC TRA worker v3	none

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	modification factor for use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,008197	ECETOC TRA worker v3	none

PROC5:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,96 mg/m ³	0,006531	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,0035 mg/kg bw/day	0,000167	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,006697	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,14 mg/m ³	0,000952	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust	0,035 mg/kg	0,001667	ECETOC TRA worker v3	none

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	ventilation, including modification factor for use of appropriate dermal protection	bw/day			
Worker - combined, long-term - systemic			0,002619	ECETOC TRA worker v3	none

PROC9:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,48 mg/m ³	0,003265	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,035 mg/kg bw/day	0,001667	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,004932	ECETOC TRA worker v3	none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario II.

Exposure Scenario worker

SILQUEST* A-187 SILANE

1. Use as an intermediate

List of use descriptors

Sector(s) of use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Product categories [PC]:	PC19: Intermediate (precursor)

Name of contributing environmental scenario and corresponding ERC	<u>Use as an intermediate:</u> ERC6a: Use of intermediate
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List of names of contributing worker scenarios and corresponding PROCs	<u>Use as an intermediate:</u> PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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2.1. Contributing exposure scenario controlling environmental exposure for: Use as an intermediate

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

SILQUEST* A-187 SILANE

Amounts used

Annual amount per site	250 tonnes/year
Daily amount per site	1 tonnes/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	250 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	400.000 m³/d
Local freshwater dilution factor	40
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	250	0 %	-	2 %	

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 section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

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Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):

type:	municipal
Discharge rate:	10.000 m³/d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

SILQUEST* A-187 SILANE

2.2. Contributing exposure scenario controlling worker exposure for: Use as an intermediate

Process Categories:	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers 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:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	1.000 kg
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SILQUEST* A-187 SILANE

Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	15 - 60 min	1 Exposure time per day	PROC1, PROC2, PROC3, PROC4
Exposure time	< 15 min	1 Exposure time per day	PROC8b

Human factors not influenced by risk management

Exposed skin areas:

Palm of one hand	240 cm ² PROC1 PROC2 PROC3
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Palm of both hands	480 cm ² PROC4 PROC8b
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	with local exhaust ventilation	90 %	PROC2, PROC3, PROC4
	Inhalation	with local exhaust ventilation	97 %	PROC8b
		Highly controlled conditions		All relevant Process Categories

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Inhalation, Dermal	Specific workers training in use of personal protective equipment	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear suitable protective clothing., Wear closed protection glasses., Wear face protective shield.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Use as an intermediate:

Compartment			Method	Remarks
Sewage treatment plant	1,64 mg/l	< 0,164	EUSES	

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Fresh water	0,0433 mg/l	0,0433	EUSES	
freshwater sediment	0,0344 mg/kg wwt	0,0435	EUSES	
Saltwater	0,0166 mg/l	0,166	EUSES	
Saltwater Sediment	0,0132 mg/kg wwt	0,167	EUSES	
Soil	0,827 µg/kg wwt	0,00636	EUSES	

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Health:

Use as an intermediate:

PROC1:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, including modification factor for exposure duration	0,019 mg/m ³	0,000129	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,035 mg/kg bw/day	0,001667	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,001796	ECETOC TRA worker v3	none

PROC2:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,19 mg/m ³	0,001293	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for	0,014 mg/kg bw/day	0,000667	ECETOC TRA worker v3	none

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	use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,001959	ECETOC TRA worker v3	none

PROC3:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,58 mg/m ³	0,003946	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,0034 mg/kg bw/day	0,000162	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,004107	ECETOC TRA worker v3	none

PROC4:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,96 mg/m ³	0,006531	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including	0,07 mg/kg bw/day	0,003333	ECETOC TRA worker v3	none

SILQUEST* A-187 SILANE

	modification factor for use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,009864	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,14 mg/m ³	0,000952	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,07 mg/kg bw/day	0,003333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,004286	ECETOC TRA worker v3	none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario III.

Exposure Scenario worker

1. Use as a monomer

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List of use descriptors	
Sector(s) of use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Product categories [PC]:	PC19: Intermediate (precursor)

Name of contributing environmental scenario and corresponding ERC	<u>Use as a monomer:</u> ERC6c: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)
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List of names of contributing worker scenarios and corresponding PROCs	<u>Use as a monomer:</u> PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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2.1. Contributing exposure scenario controlling environmental exposure for: Use as a monomer

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	250 tonnes/year
Daily amount per site	1 tonnes/day

SILQUEST* A-187 SILANE

Frequency and duration of use

Batch process:	not relevant
Continuous process:	250 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	400.000 m³/d
Local freshwater dilution factor	40
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	250	0 %	-	2 %	

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 section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

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Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):

type:	municipal
Discharge rate:	10.000 m³/d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

SILQUEST* A-187 SILANE

2.2. Contributing exposure scenario controlling worker exposure for: Use as a monomer

Process Categories:	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers 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:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	1.000 kg
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SILQUEST* A-187 SILANE

Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	15 - 60 min	1 Exposure time per day	PROC1, PROC2, PROC3, PROC4
Exposure time	< 15 min	1 Exposure time per day	PROC8b

Human factors not influenced by risk management

Exposed skin areas:

Palm of one hand	240 cm ² PROC1 PROC3
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Palm of both hands	480 cm ² PROC2 PROC4 PROC8b
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	Provide adequate general and local exhaust ventilation.	90 %	PROC2, PROC3, PROC4
	Inhalation	with local exhaust ventilation	97 %	PROC8b

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Specific workers training in use of personal protective equipment	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear closed protection glasses., Wear face protective shield., Wear suitable protective clothing.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Use as a monomer:

Compartment			Method	Remarks
Sewage treatment plant	1,64 mg/l	< 0,164	EUSES	

SILQUEST* A-187 SILANE

Fresh water	0,0433 mg/l	0,0433	EUSES	
freshwater sediment	0,0344 mg/kg wwt	0,0435	EUSES	
Saltwater	0,0166 mg/l	0,166	EUSES	
Saltwater Sediment	0,0137 mg/kg wwt	0,173	EUSES	
Soil	0,827 µg/kg wwt	0,00636	EUSES	

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Health:

Use as a monomer:

PROC1:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, including modification factor for exposure duration	0,019 mg/m ³	0,000129	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,035 mg/kg bw/day	0,001667	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,001796	ECETOC TRA worker v3	none

PROC2:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,19 mg/m ³	0,001293	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for	0,014 mg/kg bw/day	0,000667	ECETOC TRA worker v3	none

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	use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,001959	ECETOC TRA worker v3	none

PROC3:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,58 mg/m ³	0,003946	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,0034 mg/kg bw/day	0,000162	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,004107	ECETOC TRA worker v3	none

PROC4:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,96 mg/m ³	0,006531	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including	0,07 mg/kg bw/day	0,003333	ECETOC TRA worker v3	none

SILQUEST* A-187 SILANE

	modification factor for use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,009864	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,14 mg/m ³	0,000952	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,07 mg/kg bw/day	0,003333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,004286	ECETOC TRA worker v3	none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario IV.

Exposure Scenario worker

1. Formulation of:, Coatings

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List of use descriptors	
Sector(s) of use	SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
Product categories [PC]:	PC9a: Coatings and paints, thinners, paint removers

Name of contributing environmental scenario and corresponding ERC	<u>Formulation of:; Coatings:</u> ERC2: Formulation into mixture (mixtures)
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List of names of contributing worker scenarios and corresponding PROCs	<u>Formulation of::</u> PROC1: Use in closed process, no likelihood of exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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2.1.Contributing exposure scenario controlling environmental exposure for: Formulation of:; Coatings

Product characteristics

Physical state	liquid
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Viscosity:	
Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

SILQUEST* A-187 SILANE

Amounts used

Annual amount per site	40 tonnes/year
Daily amount per site	0,2 tonnes/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	200 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	20.000 m³/d
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	200	0,25 %	-	0,5 %	

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 section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

SILQUEST* A-187 SILANE

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):

type:	municipal
Discharge rate:	2.000 m³/d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

SILQUEST* A-187 SILANE

2.2. Contributing exposure scenario controlling worker exposure for: Formulation of:, Coatings

Process Categories:	PROC1: Use in closed process, no likelihood of exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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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). Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities 1 % dermal exposure Mixing or blending in batch processes Transfer of substance or mixture into small containers (dedicated filling line, including weighing) 1 - 5 % inhalation exposure Mixing or blending in batch processes Transfer of substance or mixture into small containers (dedicated filling line, including weighing)
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Physical form of the product:	liquid
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Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	200 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	15 - 60 min	1 Exposure time per day	PROC5
Exposure time	> 240 min	1 Exposure time per day	PROC8a, PROC8b, PROC9

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands	480 cm² PROC5 PROC8b PROC9
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Both hands	960 cm² PROC8a
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m³/day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet
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Technical conditions and measures to control dispersion from source towards the worker

This information is not available.

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear closed protection glasses., Wear face protective shield., Wear suitable protective clothing.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Formulation of:, Coatings:

Compartment			Method	Remarks
Sewage treatment plant	0,411 mg/l	< 0,0411	EUSES	

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Fresh water	0,043 mg/l	0,043	EUSES	
freshwater sediment	0,034 mg/kg wwt	0,043	EUSES	
Saltwater	0,0043 mg/l	0,043	EUSES	
Saltwater Sediment	0,0034 mg/kg wwt	0,043	EUSES	
Soil	1,14 µg/kg wwt	0,00877	EUSES	

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Health:

Formulation of:, Coatings:

PROC5:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, Including modification factor for concentration in product, including modification factor for exposure duration	1,9 mg/m ³	0,012925	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,014 mg/kg bw/day	0,000667	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,013592	ECETOC TRA worker v3	none

PROC8a:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation	97 mg/m ³	0,659864	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation,	1,4 mg/kg bw/day	0,06667	ECETOC TRA worker v3	none

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	including modification factor for use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,666531	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation	49,24 mg/m ³	0,334966	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,7 mg/kg bw/day	0,033333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,368299	ECETOC TRA worker v3	none

PROC9:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, Including modification factor for concentration in product	9,6 mg/m ³	0,065306	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local	0,007 mg/kg	0,000333	ECETOC TRA worker v3	none

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	exhaust ventilation, including modification factor for use of appropriate dermal protection	bw/day			
Worker - combined, long-term - systemic			0,065639	ECETOC TRA worker v3	none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario V.

Exposure Scenario worker

1. Use of coatings (e.g. beverage cans)

List of use descriptors	
Sector(s) of use	SU2b: Offshore industries SU4: Manufacture of food products SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU18: Manufacture of furniture
Product categories [PC]:	PC9a: Coatings and paints, thinners, paint removers
Name of contributing environmental scenario and corresponding ERC	<u>Use of coatings (e.g. beverage cans):</u> ERC5: Industrial use resulting in inclusion into or onto a matrix
List of names of contributing worker scenarios and corresponding PROCs	<u>Use of coatings (e.g. beverage cans):</u> PROC7: Industrial spraying

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	PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring
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2.1. Contributing exposure scenario controlling environmental exposure for: Use of coatings (e.g. beverage cans)

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	4 tonnes/year
Daily amount per site	17,5 kg/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	200 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	20.000 m ³ /d
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	200	1 %	-	0 %	

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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 section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):	
type:	municipal
Discharge rate:	2.000 m³/d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
Measures to limit air emissions:	not relevant
Remarks:	not relevant

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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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Use of coatings (e.g. beverage cans)

Process Categories:	PROC7: Industrial spraying PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring
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Product characteristics

Concentration of the substance in a mixture:	1 % dermal exposure 1 - 5 % inhalation exposure
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Physical form of the product:	liquid
Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	17,5 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	> 240 min	1 Exposure time per day	PROC7, PROC8b, PROC10, PROC13

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands	480 cm ² PROC8b PROC13
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Both hands	960 cm ² PROC10
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	Provide adequate general and local exhaust ventilation.	90 %	PROC10, PROC13
	Inhalation	Provide adequate general and local exhaust ventilation.	95 %	PROC7
	Inhalation	Provide adequate general and local exhaust ventilation.	97 %	PROC8b

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear closed protection glasses., Wear eye protection/face protection., Wear suitable protective clothing.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Use of coatings (e.g. beverage cans):

Compartment			Method	Remarks
Sewage treatment plant	0 mg/l	0	EUSES	

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Fresh water	2,34 µg/l	0,00234	EUSES	
freshwater sediment	1,86 µg/kg wwt	0,00235	EUSES	
Saltwater	0,230 µg/l	0,0023	EUSES	
Saltwater Sediment	0,183 µg/kg wwt	0,00232	EUSES	
Soil	0,190 µg/kg wwt	0,00146	EUSES	

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Health:

Use of coatings (e.g. beverage cans):

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	0,29 mg/m ³	0,001973	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,0007 mg/kg bw/day	0,000033	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,002006	ECETOC TRA worker v3	none

PROC10:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	1,9 mg/m ³	0,006803	ECETOC TRA worker v3	none

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Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,0014 mg/kg bw/day	0,000067	ECETOC TRA worker v3	none
Consumer - combined, long-term - systemic			0,006869	ECETOC TRA worker v3	none

PROC13:

	Specific condition	Exposure level		Method	Remarks
Worker - combined, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	1,9 mg/m ³	0,012925	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in	0,0007 mg/kg bw/day	0,000033	ECETOC TRA worker v3	none

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	product				
Worker - combined, long-term - systemic			0,012959	ECETOC TRA worker v3	none

PROC7:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	9,7 mg/m ³	0,065986	ECETOC TRA worker v3	none
Worker - dermal	No Exposure.		< 1	spray application	Dermal exposure not considered (automated process)

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario VI.

Exposure Scenario worker

1. Use of coatings (e.g. automotive refinishing)

List of use descriptors	
Sector(s) of use	SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Product categories [PC]:	PC9a: Coatings and paints, thinners, paint removers
Name of contributing environmental scenario and corresponding ERC	<u>Use of coatings (e.g. automotive refinishing):</u> ERC5: Industrial use resulting in inclusion into or onto a matrix
List of names of contributing worker	<u>Use of coatings (e.g. automotive refinishing):</u>

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scenarios and corresponding PROCs	PROC7: Industrial spraying PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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2.1. Contributing exposure scenario controlling environmental exposure for: Use of coatings (e.g. automotive refinishing)

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	0,4 tonnes/year
Daily amount per site	1,3 kg/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	312 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m ³ /d):	20.000 m ³ /d
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	312	36 %	-	3 %	

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 section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):	
type:	municipal
Discharge rate:	2.000 m ³ /d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
Measures to limit air emissions:	not relevant
Remarks:	not relevant

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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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Use of coatings (e.g. automotive refinishing)

Process Categories:	PROC7: Industrial spraying PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Concentration of the substance in a mixture:	1 %
Physical form of the product:	liquid
Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

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Amounts used

Maximum daily site tonnage (kg/day): 1,3 kg

Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	> 240 min	1 Exposure time per day	PROC7, PROC8b

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands 480 cm² PROC8b

Hands and forearms 1500 cm² PROC7

Other given operational conditions affecting workers exposure

Other relevant operational conditions: Respiration: 10 m³/day
Body weight:: 70 kg

Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	Provide adequate general and local exhaust ventilation.	95 %	PROC7
	Inhalation	Provide adequate general and local exhaust ventilation.	97 %	PROC8b

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear closed protection glasses., Wear face protective shield., Wear suitable protective clothing.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Use of coatings (e.g. automotive refinishing):

Compartment			Method	Remarks
Sewage treatment plant	1,64 mg/l	< 0,164	EUSES	

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Fresh water	0,167 mg/l	0,167	EUSES	
freshwater sediment	0,132 mg/kg wwt	0,167	EUSES	
Saltwater	0,0167 mg/l	0,167	EUSES	
Saltwater Sediment	0,0132 mg/kg wwt	0,167	EUSES	
Soil	0,0819 mg/kg wwt	0,63	EUSES	

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Health:

Use of coatings (e.g. automotive refinishing):

PROC7:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	9,7 mg/m ³	0,065986	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,0021 mg/kg bw/day	0,000100	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,066086	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	0,29 mg/m ³	0,001973	ECETOC TRA worker v3	none

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Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,0007 mg/kg bw/day	0,000033	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,002006	ECETOC TRA worker v3	none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario VII.

Exposure Scenario worker

1. Professional use, Coatings

List of use descriptors	
Sector(s) of use	
Product categories [PC]:	PC9a: Coatings and paints, thinners, paint removers
Name of contributing environmental scenario and corresponding ERC	<u>Professional use, Coatings:</u> ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

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List of names of contributing worker scenarios and corresponding PROCs	<u>Professional use:</u> PROC10: Roller application or brushing PROC11: Non industrial spraying PROC19: Hand-mixing with intimate contact and only PPE available
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2.1. Contributing exposure scenario controlling environmental exposure for: Professional use, Coatings

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Daily amount per site	Not relevant
Annual amount per site	Not relevant

Frequency and duration of use

Batch process:	not relevant
Continuous process:	365 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	20.000 m ³ /d
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	365	15 %	-	1 %	

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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 section 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

Air	not relevant
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):	
type:	municipal
Discharge rate:	2.000 m³/d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Spreading of sludge is assumed as a worst case scenario.
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
Solid wastes from production are ultimately disposed of via landfill or incineration.		

Method	Treatment effectiveness	Remarks
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Non-aqueous waste may be disposed off site as hazardous waste

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Professional use, Coatings

Process Categories:

PROC10: Roller application or brushing

PROC11: Non industrial spraying

PROC19: Hand-mixing with intimate contact and only PPE available

Product characteristics

Concentration of the substance in a mixture:

1 %
dermal exposure

1 - 5 %
inhalation exposure
Roller application or brushing

1 %
inhalation exposure
Non industrial spraying

Physical form of the product:

liquid

Vapour pressure:

Measured 0,011 hPa

Process temperature:

20 °C

Remarks

not relevant

Amounts used

Not applicable for wide dispersive uses.

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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	> 240 min	1 Exposure time per day	PROC10, PROC11, PROC19

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands	480 cm ² PROC10 PROC19
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Hands and forearms	1500 cm ² PROC11
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Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			0	Non industrial spraying

Other relevant operational conditions: Room volume: < 100 m³ . Non industrial spraying

Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

This information is not available.

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Professional:	Inhalation, Dermal	Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Professional:	Dermal	Wear suitable gloves.	80 %	All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

3. Exposure estimation

Environment:

Professional use, Coatings:

Compartment			Method	Remarks
Sewage treatment plant	0,79 µg/l	< 0,000079	EUSES	
Fresh water	2,42 µg/l	0,00242	EUSES	
freshwater sediment	1,92 µg/kg wwt	0,00243	EUSES	
Saltwater	0,238 µg/l	0,00238	EUSES	
Saltwater Sediment	0,189 µg/kg wwt	0,00239	EUSES	
Soil	0,577 µg/kg wwt	0,00444	EUSES	

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Health:

Professional use, Coatings:

PROC10:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, Including modification factor for concentration in product	49,2 mg/m ³	0,335374	ECETOC TRA worker v3	Manual activities involving hand contact covered with this PROC
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,055 mg/kg bw/day	0,002619	ECETOC TRA worker v3	Manual activities involving hand contact covered with this PROC
Worker - combined, long-term - systemic			0,337993	ECETOC TRA worker v3	none

PROC11:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, Including modification factor for concentration	0,33 mg/m ³	0,002245	StoffenManager (inhalation exposure)	none

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	on in product				
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,021 mg/kg bw/day	0,001000	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,003245	ECETOC TRA worker v3, StoffenManager (inhalation exposure)	No exposure assessment presented for human health.

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario VIII.

Exposure Scenario consumer

1.Consumer use, Coatings:

List of use descriptors	
Sector(s) of use	
Product categories [PC]:	PC9a: Coatings and paints, thinners, paint removers
Name of contributing environmental scenario and corresponding ERC	Uses in coatings: ERC8c: Wide dispersive indoor use resulting in inclusion

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	into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix
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List of names of contributing worker scenarios and corresponding PROCs	<u>Uses in coatings:</u> PROC10: Roller application or brushing PROC11: Non industrial spraying PROC19: Hand-mixing with intimate contact and only PPE available
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2.1. Contributing exposure scenario controlling environmental exposure for: Uses in coatings

No exposure assessment presented for the environment. Environmental exposure is considered to be covered under ES 7 as a worst case.

2.2. Contributing exposure scenario controlling consumer exposure for: Uses in coatings

Product Categories:	PC9a: Coatings and paints, thinners, paint removers : :
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Product characteristics

Concentration of the substance in a mixture:	1 %
---	-----

Physical form of the product:	liquid
Vapour pressure:	calculated 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant
Application:	not relevant

Amounts used

per task:	1 kg
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Frequency and duration of use

	Use duration (h/d):	Frequency of use:	Remarks
Exposure time	132 min	1Exposure time per year	

Human factors not influenced by risk management

Exposed skin areas:

ConsExpo default	960 cm ²
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Other given operational conditions affecting consumers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor/Outdoor use.	20 m ³		0,6	

Other relevant operational conditions	Respiration: 26 m ³ /day Body weight:: 65 kg Release duration: 120 min
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Risk management measures (RMM)

Conditions and measures related to information and behavioural advice to consumers

Consumer	Dermal Protective gloves are recommended. Wear safety glasses with side shields (or goggles).
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Conditions and measures related to personal protection, hygiene and health evaluation

See section 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH Chemical Safety Report

not relevant

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3. Exposure estimation and reference to its source

Environment:

none

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Health:

Uses in coatings:

:

	Specific condition	Exposure level		Method	Remarks
Consumer - inhalative, long-term - systemic	Including modification factor for concentration in product	0,0264 mg/m ³	0,000607	ConsExpo v4.1, Default values: Painting products - Brush and rolling painting - solvent rich paint	none
Consumer - dermal, long-term - systemic	Including modification factor for concentration in product	0,0015 mg/kg bw/day	0,000122	ConsExpo v4.1, Default values: Painting products - Brush and rolling painting - solvent rich paint	none
Consumer - combined, long-term - systemic			0,000729		none
Consumer - inhalative, short-term - systemic	Including modification factor for concentration in product	9,63 mg/m ³	0,22	ConsExpo v4.1, Default values: Painting products - Brush and rolling painting - solvent rich paint	none
Consumer - dermal, short-term - local and systemic	Including modification factor for concentration	0,55 mg/kg bw/day	0,044	ConsExpo v4.1, Default values:	none

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	on in product			Painting products - Brush and rolling painting - solvent rich paint	
Consumer - combined, short-term - systemic			0,264		none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario IX.

Exposure Scenario worker

1. Formulation of:, Non-metal, Surface treatment, Use in non-metal surface treatment.

List of use descriptors

Sector(s) of use	SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement
Product categories [PC]:	PC15: Non-metal surface treatment products

Name of contributing environmental scenario and corresponding ERC

Formulation of:, Non-metal, Surface treatment, Use in non-metal surface treatment.:
ERC2: Formulation into mixture (mixtures)

ERC5: Industrial use resulting in inclusion into or onto a matrix

List of names of contributing worker scenarios and corresponding PROCs

Formulation of::
PROC5: Mixing or blending in batch processes

PROC7: Industrial spraying

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	PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13: Treatment of articles by dipping and pouring
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2.1. Contributing exposure scenario controlling environmental exposure for: Formulation of:, Non-metal, Surface treatment, Use in non-metal surface treatment.

Product characteristics

Physical state	liquid
----------------	--------

Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	200 tonnes/year
Daily amount per site	1 tonnes/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	200 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m ³ /d):	400.000 m ³ /d
Local freshwater dilution factor	40
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	

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Continuous release	200	7,5 %	-	4 %	
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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 section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):	
type:	municipal, industrial
Discharge rate:	10.000 m³/d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
Measures to limit air emissions:	not relevant
Remarks:	not relevant

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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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Formulation of:, Non-metal, Surface treatment, Use in non-metal surface treatment.

Process Categories:	PROC5: Mixing or blending in batch processes PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13: Treatment of articles by dipping and pouring
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 25 %. Mixing or blending in batch processes Industrial spraying Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities Treatment of articles by dipping and pouring Covers percentage substance in the product up to 100 % (unless stated differently). Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Physical form of the product:	liquid
Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	1.000 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	> 240 min	1 Exposure time per day	PROC5, PROC8a, PROC8b, PROC13

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands	480 cm ² PROC5 PROC8b PROC13
Both hands	960 cm ² PROC8a

Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m³/day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	Provide adequate general and local exhaust ventilation.	97 %	PROC8b
	Inhalation	Provide adequate general and local exhaust ventilation.	90 %	PROC5, PROC8a, PROC13

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Specific workers training in use of personal protective equipment	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear suitable protective clothing., Wear closed protection glasses., Wear face protective shield.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Formulation of: Non-metal, Surface treatment, Use in non-metal surface treatment.:

Compartment			Method	Remarks
Sewage treatment plant	3,29 mg/l	< 0,329	EUSES	

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Fresh water	0,0846 mg/l	0,0846	EUSES	
freshwater sediment	0,0671 mg/kg wwt	0,0849	EUSES	
Saltwater	0,0331 mg/l	0,331	EUSES	
Saltwater Sediment	0,0263 mg/kg wwt	0,333	EUSES	
Soil	0,0822 mg/kg wwt	0,0632	EUSES	

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Health:

Formulation of: Non-metal, Surface treatment, Use in non-metal surface treatment.:

PROC5:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product, including modification factor for exposure duration	0,58 mg/m ³	0,003946	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product, including modification factor for use of appropriate dermal protection	0,0017 mg/kg bw/day	0,000081	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,004027	ECETOC TRA worker v3	none

PROC8a:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification	0,01 mg/m ³	0,000068	ECETOC TRA worker v3	none

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	n factor for concentration in product, including modification factor for exposure duration				
Worker - dermal, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product, including modification factor for use of appropriate dermal protection	0,003 mg/kg bw/day	0,000143	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,000211	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product, including modification factor for exposure duration	0,14 mg/m ³	0,000952	ECETOC TRA worker v3	none
Worker - dermal,	With local	0,017	0,000810	ECETOC TRA	none

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long-term - systemic	exhaust ventilation, Including modification factor for concentration in product, including modification factor for use of appropriate dermal protection	mg/kg bw/day		worker v3	
Worker - combined, long-term - systemic			0,001762	ECETOC TRA worker v3	none

PROC13:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	5,8 mg/m ³	0,039456	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product, including modification factor for use of appropriate dermal protection	0,017 mg/kg bw/day	0,000810	ECETOC TRA worker v3	none

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Worker - combined, long-term - systemic			0,040265	ECETOC TRA worker v3	none
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PROC7:

	Specific condition	Exposure level		Method	Remarks
Worker - all relevant routes	No Exposure.		< 1		No exposure assessment presented for human health.

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario X.

Exposure Scenario worker

1. Use in non-metal surface treatment., In situ treatment

List of use descriptors	
Sector(s) of use	SU11: Manufacture of rubber products SU12: Manufacture of plastics products, including compounding and conversion SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement
Product categories [PC]:	PC15: Non-metal surface treatment products
Name of contributing environmental scenario and corresponding ERC	<u>Use in non-metal surface treatment., In situ treatment:</u> ERC3: Formulation in materials ERC5: Industrial use resulting in inclusion into or onto a matrix
List of names of contributing worker scenarios and corresponding PROCs	<u>Use in non-metal surface treatment.:</u> PROC5: Mixing or blending in batch processes PROC7: Industrial spraying

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	PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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2.1. Contributing exposure scenario controlling environmental exposure for: Use in non-metal surface treatment., In situ treatment

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	200 tonnes/year
Daily amount per site	1 tonnes/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	200 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	400.000 m ³ /d
Local freshwater dilution factor	40
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	20	0,025 %	-	0,035 %	

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 section 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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):	
type:	municipal, industrial
Discharge rate:	10.000 m ³ /d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
Measures to limit air emissions:	not relevant
Remarks:	not relevant

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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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous waste		

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Use in non-metal surface treatment., In situ treatment

Process Categories:	PROC5: Mixing or blending in batch processes PROC7: Industrial spraying PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers 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:	Measured 0,011 hPa
Process temperature:	20 °C

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Remarks	not relevant
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Amounts used

Maximum daily site tonnage (kg/day):	1.000 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	< 15 min	1 Exposure time per day	PROC8b
Exposure time	15 - 60 min	1 Exposure time per day	PROC5

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands	480 cm ² PROC5 PROC8b
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet
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Technical conditions and measures to control dispersion from source towards the worker

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	Provide adequate general and local exhaust ventilation.	90 %	PROC5
	Inhalation	Provide adequate general and local exhaust ventilation.	97 %	PROC8b

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Specific workers training in use of personal protective equipment	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear suitable protective clothing., Wear closed protection glasses., Wear face protective shield.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Use in non-metal surface treatment., In situ treatment:

Compartment			Method	Remarks
Sewage treatment plant	0,0288 mg/l	< 0,0029	EUSES	

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Fresh water	3,06 µg/l	0,00306	EUSES	
freshwater sediment	2,43 µg/kg wwt	0,00308	EUSES	
Saltwater	0,518 µg/l	0,00518	EUSES	
Saltwater Sediment	0,411 µg/kg wwt	0,0052	EUSES	
Soil	0,795 µg/kg wwt	0,00612	EUSES	

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Health:

Use in non-metal surface treatment., In situ treatment:

PROC5:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,97 mg/m ³	0,006599	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,007 mg/kg bw/day	0,000333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,006923	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,14 mg/m ³	0,000952	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate	0,07 mg/kg bw/day	0,003333	ECETOC TRA worker v3	none

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	e dermal protection				
Worker - combined, long-term - systemic			0,004286	ECETOC TRA worker v3	none

PROC7:

	Specific condition	Exposure level		Method	Remarks
Worker - all relevant routes	No Exposure.		0		No exposure assessment presented for human health.

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XI.

Exposure Scenario worker

1. Formulation of sealants.

List of use descriptors

Sector(s) of use	SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
Product categories [PC]:	PC1: Adhesives, sealants

Name of contributing environmental scenario and corresponding ERC

Formulation of sealants.:
ERC2: Formulation into mixture (mixtures)

List of names of contributing worker scenarios and corresponding PROCs

Formulation of sealants.:
PROC5: Mixing or blending in batch processes

PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

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2.1. Contributing exposure scenario controlling environmental exposure for: Formulation of sealants.

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	200 tonnes/year
Daily amount per site	1 tonnes/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	200 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	20.000 m ³ /d
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	200	2,5 %	-	0,325 %	

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

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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):	
type:	municipal, industrial
Discharge rate:	2.000 m ³ /d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous		

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waste

Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Formulation of sealants.

Process Categories:

PROC5: Mixing or blending in batch processes

PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Product characteristics

Concentration of the substance in a mixture:

Covers percentage substance in the product up to 100 % (unless stated differently).
Mixing or blending in batch processes
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

10 %
dermal exposure
Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Covers percentage substance in the product up to 25 %.
inhalation exposure
Transfer of substance or mixture into small containers (dedicated filling line, including weighing)

Physical form of the product:

liquid

Vapour pressure:

Measured 0,011 hPa

Process temperature:

20 °C

Remarks

not relevant

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Amounts used

Maximum daily site tonnage (kg/day): 1.000 kg Formulation

Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	15 - 60 min	1 Exposure time per day	PROC5
Exposure time	> 240 min	1 Exposure time per day	PROC8b, PROC9

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands 480 cm² PROC5 PROC8b PROC9

Other given operational conditions affecting workers exposure

Other relevant operational conditions: Respiration: 10 m³/day
Body weight:: 70 kg

Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	Provide adequate general and local exhaust ventilation.	97 %	PROC8b
	Inhalation	Provide adequate general and local exhaust ventilation.	90 %	PROC5, PROC9

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Specific workers training in use of personal protective equipment	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear suitable protective clothing., Wear closed protection glasses., Wear face protective shield.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Formulation of sealants.:

Compartment			Method	Remarks
Sewage treatment plant	1,33 mg/l	< 0,13	EUSES	

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Fresh water	0,136 mg/l	0,136	EUSES	
freshwater sediment	0,108 mg/kg wwt	0,137	EUSES	
Saltwater	0,0136 mg/l	0,136	EUSES	
Saltwater Sediment	0,0108 mg/kg wwt	0,137	EUSES	
Soil	0,0278 mg/kg wwt	0,214	EUSES	

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Health:

Formulation of sealants.:

PROC5:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,97 mg/m ³	0,006599	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,007 mg/kg bw/day	0,000333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,006932	ECETOC TRA worker v3	none

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation	1,4 mg/m ³	0,009524	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,07 mg/kg bw/day	0,003333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,012857	ECETOC TRA worker v3	none

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PROC9:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, Including modification factor for concentration in product	2,9 mg/m ³	0,019728	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,007 mg/kg bw/day	0,000333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,020061	ECETOC TRA worker v3	none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XII.

Exposure Scenario worker

1.Industrial use of sealants.

List of use descriptors

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Sector(s) of use	SU5: Manufacture of textiles, leather, fur SU6a: Manufacture of wood and wood products SU6b: Manufacture of pulp, paper and paper products SU12: Manufacture of plastics products, including compounding and conversion SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU19: Building and construction work
Product categories [PC]:	PC1: Adhesives, sealants
Name of contributing environmental scenario and corresponding ERC	<u>Industrial use of sealants.:</u> ERC8b: Wide dispersive indoor use of reactive substances in open systems
List of names of contributing worker scenarios and corresponding PROCs	<u>Industrial use of sealants.:</u> PROC7: Industrial spraying PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation

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2.1. Contributing exposure scenario controlling environmental exposure for: Industrial use of sealants.

Product characteristics

Physical state	liquid
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Viscosity:

Kinematic viscosity:	2,7 mm ² /s (20 °C, calculated)
Dynamic viscosity:	2,9 mPa·s (20 °C, calculated)

Amounts used

Annual amount per site	100 tonnes/year
Daily amount per site	0,5 tonnes/day

Frequency and duration of use

Batch process:	not relevant
Continuous process:	200 Emission days

Environment factors not influenced by risk management

Flow rate of receiving surface water (m³/d):	20.000 m ³ /d
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Continuous release	200	0,1 %	-	0 %	

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

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

Air	Air emission abatement not specifically required for this substance.
Soil	not relevant
Water	Ensure all waste water is collected and treated via a WWTP.
Sediment:	not relevant
Remarks:	not relevant

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

Size of municipal sewage system/treatment plant (m³/d):	
type:	municipal, industrial
Discharge rate:	2.000 m ³ /d
Treatment effectiveness:	not relevant
Sludge treatment technique:	Incinerate or landfill. Spreading of sludge is assumed as a worst case scenario.
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
Solid wastes from production are ultimately disposed of via landfill or incineration., Aqueous waste is treated in on-site or municipal secondary biological treatment plants prior to discharge.		

Method	Treatment effectiveness	Remarks
Non-aqueous waste may be disposed off site as hazardous		

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waste		
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Conditions and measures related to external recovery of waste

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.2. Contributing exposure scenario controlling worker exposure for: Industrial use of sealants.

Process Categories:	PROC7: Industrial spraying PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation
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Product characteristics

Concentration of the substance in a mixture:	5 - 25 % inhalation exposure 10 % dermal exposure
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Physical form of the product:	liquid
Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	500 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	60 - 240 min	1 Exposure time per day	PROC8b
Exposure time	> 240 min	1 Exposure time per day	PROC10, PROC13, PROC14

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands	480 cm ² PROC8b PROC13 PROC14
Both hands	960 cm ² PROC10

Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	without local exhaust ventilation		All relevant Process Categories

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Dermal	Wear suitable protective clothing., Wear closed protection glasses., Wear face protective shield.		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

Industrial use of sealants.:

Compartment			Method	Remarks
Sewage treatment plant	0 mg/l	0	EUSES	

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Fresh water	2,34 µg/l	0,00234	EUSES	
freshwater sediment	1,86 µg/kg wwt	0,00235	EUSES	
Saltwater	0,23 µg/l	0,00230	EUSES	
Saltwater Sediment	0,183 µg/kg wwt	0,00232	EUSES	
Soil	1,06 µg/kg wwt	0,00815	EUSES	

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Health:

Industrial use of sealants.:

PROC8b:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, Including modification factor for concentration in product, including modification factor for exposure duration	17 mg/m ³	0,115646	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,069 mg/kg bw/day	0,003286	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,118932	ECETOC TRA worker v3	none

PROC10:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust	58 mg/m ³	0,394558	ECETOC TRA worker v3	none

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	ventilation, Including modification factor for concentration in product				
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,28 mg/kg bw/day	0,013333	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,407891	ECETOC TRA worker v3	none

PROC13:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, Including modification factor for concentration in product	58 mg/m ³	0,394558	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modificatio	0,14 mg/kg bw/day	0,006667	ECETOC TRA worker v3	none

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	n factor for use of appropriate dermal protection, Including modification n factor for concentration in product				
Worker - combined, long-term - systemic			0,401224	ECETOC TRA worker v3	none

PROC14:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, Including modification n factor for concentration in product	29 mg/m ³	0,197279	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification n factor for use of appropriate dermal protection, Including modification n factor for concentration in product	0,034 mg/kg bw/day	0,001619	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,198898	ECETOC TRA worker v3	none

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PROC7:

	Specific condition	Exposure level		Method	Remarks
Worker - all relevant routes	No Exposure.		0		none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XIII.

Exposure Scenario worker

1. Professional use of sealants.

List of use descriptors	
Sector(s) of use	SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Product categories [PC]:	PC1: Adhesives, sealants
Name of contributing environmental scenario and corresponding ERC	<u>Professional use of sealants.:</u> ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix
List of names of contributing worker scenarios and corresponding PROCs	<u>Professional use of sealants.:</u> PROC10: Roller application or brushing PROC19: Hand-mixing with intimate contact and only PPE available

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2.1. Contributing exposure scenario controlling environmental exposure for: Professional use of sealants.

No exposure assessment presented for the environment.

2.2. Contributing exposure scenario controlling worker exposure for: Professional use of sealants.

Process Categories:	PROC10: Roller application or brushing PROC19: Hand-mixing with intimate contact and only PPE available
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Product characteristics

Concentration of the substance in a mixture:	10 %
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Physical form of the product:	liquid
Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

per shift:	3,1 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	480 min	3 Exposure time per day	PROC19

Human factors not influenced by risk management

Exposed skin areas:

ConsExpo default, Joint sealants	2 cm ²
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Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor/Outdoor use.	30 m3		4,2	

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Other relevant operational conditions:

Respiration: 10 m³/day
Body weight:: 70 kg
Release area: estimated 1 m²

Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

This information is not available.

Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Professional:	Dermal, Inhalation	Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Professional:	Dermal, Inhalation	Wear suitable gloves., Wear eye protection/face protection.		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

3. Exposure estimation

Environment:

none

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Health:

Professional use of sealants.:

PROC19:

	Specific condition	Exposure level		Method	Remarks
Worker - dermal, long-term - systemic	Including modification factor for concentration in product	2,14 mg/kg bw/day	0,102	ConsExpo v4.1, Joint sealants	none
Worker - inhalative, long-term - systemic	Including modification factor for concentration in product	105 mg/m ³	0,714	ConsExpo v4.1, Joint sealants	none
Worker - combined, long-term - systemic			0,816		none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XIV.

Exposure Scenario consumer

1.Consumer use, Sealants:

List of use descriptors

Sector(s) of use	SU21: Consumer uses: Private households (= general public = consumers)
Product categories [PC]:	PC1: Adhesives, sealants

Name of contributing environmental scenario and corresponding ERC	<u>Consumer use, Sealants:</u> ERC8c: Widespread use leading to inclusion into/onto article (indoor) ERC8f: Widespread use leading to inclusion into/onto article (outdoor)
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List of names of contributing worker scenarios and corresponding PROCs	<u>Consumer use:</u> PROC10: Roller application or brushing PROC19: Hand-mixing with intimate contact and only PPE available
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2.1. Contributing exposure scenario controlling environmental exposure for: Consumer use, Sealants

No exposure assessment presented for the environment.

2.2. Contributing exposure scenario controlling consumer exposure for: Consumer use, Sealants

Product Categories:	PC1: Adhesives, sealants :
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Product characteristics

Concentration of the substance in a mixture:	10 %
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Physical form of the product:	liquid
Vapour pressure:	calculated 0,011 hPa
Process temperature:	not relevant
Remarks	not relevant
Application:	not relevant

Amounts used

per task:	0,075 kg
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Frequency and duration of use

	Use duration (h/d):	Frequency of use:	Remarks
Exposure time	45 min	3Exposure time per year	

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Human factors not influenced by risk management

Exposed skin areas:

ConsExpo default, Joint sealants	2 cm ²
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Other given operational conditions affecting consumers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use	10 m ³		2	

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

Conditions and measures related to information and behavioural advice to consumers

Consumer	Dermal Protective gloves are recommended. Wear safety glasses with side shields (or goggles).
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Conditions and measures related to personal protection, hygiene and health evaluation

See section 8 of the safety data sheet (Personal protection equipment)
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Additional good practice advice beyond the REACH Chemical Safety Report

not relevant

3. Exposure estimation and reference to its source

Environment:

none

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Health:

Consumer use, Sealants:

:

	Specific condition	Exposure level		Method	Remarks
Consumer - inhalative, long-term - systemic	Including modification factor for concentration in product	0,027 mg/m ³	0,000621	ConsExpo v4.1, Joint sealants	none
Consumer - dermal, long-term - systemic	Including modification factor for concentration in product	0,019 mg/kg bw/day	0,0015		none
Consumer - combined, long-term - systemic			0,002121		none
Consumer - inhalative, short-term - systemic	Including modification factor for concentration in product	3,28 mg/m ³	0,075	ConsExpo v4.1, Joint sealants	none
Consumer - dermal, short-term - local and systemic	Including modification factor for concentration in product	2,31 mg/kg bw/day	0,18		none
Consumer - combined, short-term - systemic			0,255		none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XV.

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Exposure Scenario worker

1. Use as laboratory reagent

List of use descriptors

Sector(s) of use	SU24: Scientific research and development
Product categories [PC]:	PC21: Laboratory chemicals

Name of contributing environmental scenario and corresponding ERC	<u>Use as laboratory reagent:</u> : None
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List of names of contributing worker scenarios and corresponding PROCs	<u>Use as laboratory reagent:</u> PROC15: Use as laboratory reagent
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2.1. Contributing exposure scenario controlling environmental exposure for: Use as laboratory reagent

No exposure assessment presented for the environment.

2.2. Contributing exposure scenario controlling worker exposure for: Use as laboratory reagent

Process Categories:	PROC15: Use as laboratory reagent
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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:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

Maximum daily site tonnage (kg/day):	0,01 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	< 15 min	1 Exposure time per day	PROC15

Human factors not influenced by risk management

Exposed skin areas:

Palm of one hand	240 cm ² PROC15
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	Containment measures required		PROC15
	Inhalation	with local exhaust ventilation		PROC15

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Basic workers training in use of personal protective equipment.	PROC15

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal	Wear suitable protective clothing., Wear eye protection/face protection.		PROC15
	Dermal	Wear suitable gloves.	90 %	PROC15
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		PROC15

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

3. Exposure estimation

Environment:

none

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Health:
Use as laboratory reagent:
PROC15:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration	0,48 mg/m ³	0,00327	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection	0,034 mg/kg bw/day	0,00162	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,00489		none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XVI.
Exposure Scenario worker
1.Textiles
List of use descriptors

Sector(s) of use	SU5: Manufacture of textiles, leather, fur SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
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Product categories [PC]:	PC34: Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Name of contributing environmental scenario and corresponding ERC	<u>Textiles:</u> ERC2: Formulation into mixture (mixtures) ERC6b: Industrial use of reactive processing aids
List of names of contributing worker scenarios and corresponding PROCs	<u>Textiles:</u> PROC5: Mixing or blending in batch processes PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring

2.1. Contributing exposure scenario controlling environmental exposure for: Textiles

No exposure assessment presented for the environment.

2.2. Contributing exposure scenario controlling worker exposure for: Textiles

Process Categories:	PROC5: Mixing or blending in batch processes PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring
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SILQUEST* A-187 SILANE

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 % (unless stated differently). Mixing or blending in batch processes Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities Transfer of substance or mixture into small containers (dedicated filling line, including weighing) 1 % Roller application or brushing Treatment of articles by dipping and pouring
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Physical form of the product:	liquid
Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	15 - 60 min	1 Exposure time per day	PROC5, PROC8b, PROC9
Exposure time	> 240 min	1 Exposure time per day	PROC10, PROC13

Human factors not influenced by risk management

Exposed skin areas:

Palm of both hands	480 cm² PROC5 PROC8b PROC9 PROC13
Both hands	960 cm² PROC10

Other given operational conditions affecting workers exposure

Other relevant operational conditions:	not relevant
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SILQUEST* A-187 SILANE

Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	with local exhaust ventilation	90 %	PROC10

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Inhalation, Dermal	Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories
	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	PROC10, PROC13
	Dermal	Wear suitable protective clothing., Wear eye protection/face protection.		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

none

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Health:

Textiles:

PROC5:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, including modification factor for exposure duration	9,7 mg/m ³	0,065986	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection	1,4 mg/kg bw/day	0,066667	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,132653	ECETOC TRA worker v3	none

PROC8b, PROC9:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, including modification factor for exposure duration	9,7 mg/m ³	0,065986	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including	0,69 mg/kg bw/day	0,032857	ECETOC TRA worker v3	none

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	modification factor for use of appropriate dermal protection				
Worker - combined, long-term - systemic			0,098844	ECETOC TRA worker v3	none

PROC10:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	With local exhaust ventilation, including modification factor for exposure duration, Including modification factor for concentration in product	0,39 mg/m ³	0,002653	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	With local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,0014 mg/kg bw/day	0,000067	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,002720	ECETOC TRA worker v3	none

PROC13:

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	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic	Without local exhaust ventilation, including modification factor for exposure duration, Including modification factor for concentration in product	3,9 mg/m ³	0,026531	ECETOC TRA worker v3	none
Worker - dermal, long-term - systemic	Without local exhaust ventilation, including modification factor for use of appropriate dermal protection, Including modification factor for concentration in product	0,0068 mg/kg bw/day	0,000324	ECETOC TRA worker v3	none
Worker - combined, long-term - systemic			0,026854	ECETOC TRA worker v3	none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XVII.

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Exposure Scenario worker

1. Manufacture of silicon wafers for semiconductors industry, including photovoltaics, Manufacture of, Electronics

List of use descriptors	
Sector(s) of use	SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU16: Manufacture of computer, electronic and optical products, electrical equipment
Product categories [PC]:	PC9a: Coatings and paints, thinners, paint removers PC33: Semiconductors

Name of contributing environmental scenario and corresponding ERC	<u>Manufacture of silicon wafers for semiconductors industry, including photovoltaics, Manufacture of, Electronics:</u> ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6b: Industrial use of reactive processing aids
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List of names of contributing worker scenarios and corresponding PROCs	<u>Manufacture of silicon wafers for semiconductors industry, including photovoltaics:</u> PROC2: Use in closed, continuous process with occasional controlled exposure PROC5: Mixing or blending in batch processes PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
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2.1. Contributing exposure scenario controlling environmental exposure for: Manufacture of silicon wafers for semiconductors industry, including photovoltaics, Manufacture of, Electronics

No exposure assessment presented for the environment.

2.2. Contributing exposure scenario controlling worker exposure for: Manufacture of silicon wafers for semiconductors industry, including photovoltaics, Manufacture of, Electronics

Process Categories:	PROC2: Use in closed, continuous process with occasional controlled exposure PROC5: Mixing or blending in batch processes PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
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Product characteristics

Concentration of the substance in a mixture:	40 %
Physical form of the product:	liquid
Vapour pressure:	Measured 0,011 hPa
Process temperature:	20 °C
Remarks	not relevant

Amounts used

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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	> 240 min	1 Exposure time per day	PROC1, PROC2, PROC8a, PROC9

Human factors not influenced by risk management

Exposed skin areas:

OECD ESD model	420 cm ²
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Other given operational conditions affecting workers exposure

Other relevant operational conditions:	Respiration: 10 m ³ /day Body weight:: 70 kg
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Dermal, Inhalation	Containment measures required		All relevant Process Categories
	Inhalation	with local exhaust ventilation		All relevant Process Categories

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Organisational measures to prevent/limit releases, dispersion and exposure

Application	Route of Exposure	Protective Measures	Remarks
Industrial:	Dermal, Inhalation	Regular training of workers with respect to substance hazards and safe handling, Basic workers training in use of personal protective equipment.	All relevant Process Categories

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Industrial:	Inhalation	If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn., Respiratory protection mask with Filtrertype ABEK		All relevant Process Categories
	Dermal	Wear suitable gloves.	90 %	All relevant Process Categories
	Dermal	Wear suitable protective clothing.		All relevant Process Categories
	Inhalation, Dermal	See section 8 of the safety data sheet (Personal protection equipment)		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

Procedural and technological control using Best Available Technique (BAT)

3. Exposure estimation

Environment:

none

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Health:

Manufacture of silicon wafers for semiconductors industry, including photovoltaics, Manufacture of, Electronics:

PROC8a, PROC9:

	Specific condition	Exposure level		Method	Remarks
Worker - dermal	including modification factor for use of appropriate dermal protection, With local exhaust ventilation	0,5 mg/kg bw/day	0,0238	OECD ESD model	none
Worker - inhalative	No Exposure.		0		none

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XVIII.

Exposure Scenario worker

1. Professional use, Methanol, Exposure to substances released during end-use of products

List of use descriptors	
Sector(s) of use	SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Product categories [PC]:	
Name of contributing environmental scenario and corresponding ERC	
List of names of contributing worker scenarios and corresponding PROCs	<u>Professional use:</u> : <u>Professional use:</u>

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2.2. Contributing exposure scenario controlling worker exposure for: Professional use, Methanol, Exposure to substances released during end-use of products

Process Categories:	:
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Product characteristics

Concentration of the substance in a mixture:	4.1 %
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Physical form of the product:	gaseous
Vapour pressure:	ca. 0,0128 hPa
Process temperature:	not relevant
Remarks	not relevant

Amounts used

Amounts used	3,1 kg
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Exposure time	480 min	1 takes per day	

Human factors not influenced by risk management

Exposed skin areas:

ConsExpo default	2 cm ²
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Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use	30 m ³		4,2	

Other relevant operational conditions:	Body weight:: 70 kg Respiration: 10 m ³ /day
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Risk management measures (RMM)

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

See section 8 of the safety data sheet

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

This information is not available.

Organisational measures to prevent/limit releases, dispersion and exposure

This information is not available.

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

Application	Route of Exposure	Protective Measures	Effectiveness	Remarks
Professional:	Dermal	Wear suitable gloves., Wear eye protection/face protection.		All relevant Process Categories

Additional good practice advice beyond the REACH Chemical Safety Report

This information is not available.

2.3. Contributing exposure scenario controlling worker exposure for: Professional use, Methanol, Exposure to substances released during end-use of products

No exposure assessment presented for the environment.

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3. Exposure estimation

Environment:

Health:

Professional use, Methanol, Exposure to substances released during end-use of products:

All relevant Process Categories:

	Specific condition	Exposure level		Method	Remarks
Worker - inhalative, long-term - systemic		42 mg/m ³	0,16	ConsExpo 4.1 (Consumer inhalation exposure), Joint sealants	none
Worker - dermal, long-term - systemic	No Exposure.		0	ConsExpo v4.1, Joint sealants	none

Professional use, Methanol, Exposure to substances released during end-use of products:

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

Exposure Scenario XIX.

Exposure Scenario consumer

1.Consumer use, Methanol, Exposure to substances released during end-use of products:

List of use descriptors	
Sector(s) of use	SU21: Consumer uses: Private households (= general public = consumers)
Product categories [PC]:	
Name of contributing environmental scenario and corresponding ERC	
List of names of contributing worker	<u>Consumer use:</u>

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scenarios and corresponding PROCs	: <u>Consumer use:</u> :
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2.2. Contributing exposure scenario controlling consumer exposure for: Consumer use, Methanol, Exposure to substances released during end-use of products

Product characteristics

Concentration of the substance in a mixture:	4.1 %
Physical form of the product:	gaseous
Vapour pressure:	0,0128 hPa
Process temperature:	not relevant
Remarks	not relevant
Application:	not relevant

Amounts used

Daily amount for wide dispersive uses	0,075 kg
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Frequency and duration of use

	Use duration (h/d):	Frequency of use:	Remarks
Exposure time	45 min	3Exposure time per year	

Human factors not influenced by risk management

Exposed skin areas:

ConsExpo default	2 cm ²
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Other given operational conditions affecting consumers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use	10 m3		2	

Other relevant operational conditions

Body weight:: 65 kg
Respiration: 37,44 m³/day
Release duration: 30 min

Risk management measures (RMM)

This information is not available.

Additional good practice advice beyond the REACH Chemical Safety Report

not relevant

2.3. Contributing exposure scenario controlling consumer exposure for: Consumer use, Methanol, Exposure to substances released during end-use of products

No exposure assessment presented for the environment.

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3. Exposure estimation and reference to its source

Environment:

Health:

Consumer use, Methanol, Exposure to substances released during end-use of products:

All relevant Process Categories:

	Specific condition	Exposure level		Method	Remarks
Consumer - inhalative, short-term - local and systemic		4,98 mg/m ³	0,096	ConsExpo 4.1 (Consumer inhalation exposure)	none
Consumer - dermal	No Exposure.		0	ConsExpo v4.1	none
Consumer - inhalative, long-term - local and systemic		0,049 mg/m ³	0,00092	ConsExpo 4.1 (Consumer inhalation exposure)	none
Consumer - dermal, long-term - local and systemic	No Exposure.		0	ConsExpo v4.1	none

Consumer use, Methanol, Exposure to substances released during end-use of products:

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

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>). If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.