

**Safety Data Sheet according to Regulation (EC)  
No. 1907/2006 (REACH)**

Printed 12.05.2021  
Revision 12.05.2021 (GB) Version 17.0

**Methyl chloride**  
2600, 70260



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

**1.1. Product identifier**

<b>Name of product</b>	Methyl chloride Art-Nr(n): 2600, 70260
<b>Name of substance</b>	Chloromethane (Methyl chloride)
<b>Index No</b>	602-001-00-7
<b>EC No</b>	200-817-4
<b>REACH registration number</b>	01-2119493708-22
<b>CAS No</b>	74-87-3

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

**Identified uses**

**Sector of uses [SU]**

SU11 - Manufacture of rubber products  
SU22 - Professional uses: Public domain (administration, education, entertainment, services, craftsmen)  
SU24 - Scientific research and development  
SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites  
SU8 - Manufacture of bulk, large scale chemicals (including petroleum products)  
SU9 - Manufacture of fine chemicals

**Product categories [PC]**

PC19 - Intermediate  
PC21 - Laboratory chemicals  
PC35 - Washing and cleaning products  
PC40 - Extraction agents

**Process categories [PROC]**

PROC1 - Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.  
PROC2 - Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions  
PROC3 - Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition  
PROC15 - Use as laboratory reagent

**Environmental release categories [ERC]**

ERC1 - Manufacture of the substance  
ERC8b - Widespread use as reactive processing aid (no inclusion into or onto article, indoor)  
ERC8e - Widespread use as reactive processing aid (no inclusion into or onto article, outdoor)  
ERC4 - Use as non-reactive processing aid at industrial site (no inclusion into or onto article)  
ERC6a - Use as intermediate product

**! Remark**

Restricted to professional users.

**Recommended intended purpose(s)**

Basic substance.  
Intermediate.  
Laboratory reagent.

**1.3. Details of the supplier of the safety data sheet**

<b>Manufacturer/distributor</b>	GHC Gerling, Holz & Co. Handels GmbH Ruhrstraße 113, D-22761 Hamburg Phone +49 40 853 123-0, Fax +49 40 853 123-66 E-Mail <a href="mailto:hamburg@ghc.de">hamburg@ghc.de</a> Internet <a href="http://www.ghc.com">www.ghc.com</a>
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**Advice**

GHC Gerling, Holz & Co. Handels GmbH  
Phone +49 40 853 123-0  
Fax +49 40 853 123-66  
E-mail (competent person):  
msds@ghc.de

**1.4. Emergency telephone number**

**Emergency advice**

Giftinformationszentrum Mainz  
Phone +49 6131 19240

**! SECTION 2: Hazards identification**

**2.1. Classification of the substance or mixture**

**! Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]**

Hazard classes and Hazard categories      Hazard Statements      Classification procedure

<b>Flam. Gas 1B</b>	<b>H221</b>
<b>Press. Gas (Liq.)</b>	<b>H280</b>
<b>Carc. 2</b>	<b>H351</b>
<b>Repr. 2</b>	<b>H361f</b>
<b>STOT RE 2</b>	<b>H373</b>

**! Hazard statements for physical hazards**

**H221**      **Flammable gas.**  
**H280**      **Contains gas under pressure; may explode when heated.**

**! Hazard statements for health hazards**

**H351**      **Suspected of causing cancer by inhalation.**  
**H361f**      **Suspected of damaging fertility.**  
**H373**      **May cause damage to central nervous system, urogenital tract and liver through prolonged or repeated exposure by inhalation.**

**Additional hints**

Listed substance (Regulation (EC) No 1272/2008, Annex VI, part 3).

**2.2. Label elements**

Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]



**GHS02**



**GHS08**

**! Signal word**

**Danger**

**! Hazard statements for physical hazards**

**H221**      **Flammable gas.**  
**H280**      **Contains gas under pressure; may explode when heated.**

**! Hazard statements for health hazards**

**H351**      **Suspected of causing cancer by inhalation.**  
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**Precautionary Statements**

**! Prevention**

P202 Do not handle until all safety precautions have been read and understood.  
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P260 Do not inhale gas/vapours.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.

**! Response**

P308 + P313 IF exposed or concerned: Get medical advice/attention.  
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
P381 In case of leakage, eliminate all ignition sources.

**! Storage**

P403 Store in a well-ventilated place.

**Hazardous ingredients for labelling**

Chloromethane (Methyl chloride)

**2.3. Other hazards**

**! Information pertaining to special dangers for human and environment**

Can form explosive mixture with air.  
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.  
Contact with liquid may cause cold burns/frostbite.  
Receptacle under pressure.

**Results of PBT and vPvB assessment**

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

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**! SECTION 3: Composition/ information on ingredients**

**3.1. Substances**

**! Description**

Content: >= 99,9 %

**CAS No 74-87-3**

**Chloromethane (Methyl chloride)**

EC No 200-817-4

Index No 602-001-00-7

REACH registration number 01-2119493708-22

**3.2. Mixtures**

not applicable

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**! SECTION 4: First aid measures**

**4.1. Description of first aid measures**

**General information**

Remove contaminated soaked clothing immediately.  
Adhere to personal protective measures when giving first aid.  
Seek medical advice immediately.

**In case of inhalation**

Remove the affected person into fresh air and keep him immobile.  
In the event of pulmonary irritation treat initially with corticoid spray, e.g. Ventolair- or Pulmicort- metered-dose aerosol (Ventolair and Pulmicort are registered trademarks).  
Seek medical treatment immediately.  
In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

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### ! In case of skin contact

In case of frostbite rinse with lukewarm (not hot) water for at least 15 minutes. Do not remove clothing frozen to the skin. Thaw with lukewarm water. Apply a sterile dressing. Obtain medical assistance.

Seek medical treatment immediately.

In case of contact with skin wash off immediately and for a long time (at least 15 minutes) with plenty of water.

### In case of eye contact

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Call for a doctor immediately.

### In case of ingestion

Ingestion is not considered a potential route of exposure.

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

#### ! Physician's information / possible symptoms

Eye defects

Unconsciousness

vomiting

Headache

Dizziness

#### ! Physician's information / possible dangers

Risk of cardiac rhythm disturbances

Risk of deterioration due to consumption of alcohol.

Risk of pulmonary oedema

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

#### ! Treatment (Advice to doctor)

Treat symptoms.

Do not give any preparations of the adrenalin-ephedrine group.

Pulmonary oedema prophylaxis.

Keep under medical supervision for at least 24 hours.

Symptoms may not occur until several hours.

## ! SECTION 5: Firefighting measures

### 5.1. Extinguishing media

#### ! Suitable extinguishing media

Foam

Dry powder

Water spray jet

#### ! Unsuitable extinguishing media

carbon dioxide

Full water jet

### 5.2. Special hazards arising from the substance or mixture

In case of fire formation of dangerous gases possible.

Formation of explosive gas mixtures in contact with air.

In the event of fire the following can be released:

Carbon monoxide (CO)

Carbon dioxide (CO<sub>2</sub>)

Hydrogen chloride (HCl)

Phosgene

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**5.3. Advice for firefighters**

**Special protective equipment for fire-fighters**

Use breathing apparatus with independent air supply ( isolated ).  
Wear full protective clothing.

**Additional information**

Cool endangered containers with water spray jet.  
Exposure to fire may cause rupture / explosion of the containers.  
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur.  
Extinguish any other fire.  
Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

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**! SECTION 6: Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel**

Evacuate area.  
Keep people away and stay on the upwind side.  
Keep away sources of ignition.

**! For emergency responders**

Move people to safety.  
Keep area evacuated and free from ignition sources until any spilled liquid has evaporated. (Ground free from frost).  
Personal protection by wearing close-fitting protective clothing and breathing apparatus.  
Eliminate all ignition sources if safe to do so.  
Pay attention to extension of gas especially at ground (heavier than air) and in direction of the wind.

**6.2. Environmental precautions**

Do not discharge into the drains/surface waters/groundwater.  
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.  
If necessary, secure leaky pressure receptacles using a salvage container.  
Do not discharge into the subsoil/soil.

**6.3. Methods and material for containment and cleaning up**

Ensure adequate air ventilation.  
Allow to vaporise.

**6.4. Reference to other sections**

Safe handling: see section 7  
Disposal: see section 13  
Personal protection equipment: see section 8

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**! SECTION 7: Handling and storage**

**7.1. Precautions for safe handling**

**! Advice on safe handling**

Use only in thoroughly ventilated areas.  
Transfer and handle only in enclosed systems.  
Containers' temperature should not be increased above 50 °C.  
The working pressure in the receptacle must not exceed the saturation vapour pressure of the pure product resulting at a temperature of 50 °C.  
Take measures against electrostatically charging.  
Ground barrels and installations.  
Use antistatic tools.  
Provide good room ventilation even at ground level (vapours are heavier than air).  
Prevent cylinders from falling over.  
Avoid release to the environment.

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Ensure valve protection device is correctly fitted.  
Ensure valve outlet cap nut or plug (where provided) is correctly fitted.  
Open valve slowly to avoid pressure shock.  
Do not allow backflow into the container.  
Entering of water into the container must be prevented.  
No water to valves, flanges and other fittings.  
Purging of pipes and valves with inert gases - to avoid: water, solvents.

#### ! General protective measures

Do not inhale gases/vapours/aerosols.

#### Hygiene measures

At work do not eat, drink or smoke.  
Wash hands before breaks and after work.

#### ! Advice on protection against fire and explosion

The product is combustible.  
Because of risk of explosion avoid vapours getting into cellar, sewage system and holes.  
Formation of explosive gas mixtures in contact with air.  
Pay attention to general rules of internal fire prevention.  
Use explosion-proof equipment / fittings and non-sparking tools.

#### 7.2. Conditions for safe storage, including any incompatibilities

##### ! Requirements for storage rooms and vessels

Keep in closed original container.  
Ventilate store-rooms thoroughly.  
Only use containers that are approved specifically for the substance/product.  
Suitable materials: Normalised carbon steel, tempered alloy steel, austenitic stainless steels.  
Valve: Suitable materials: Brass, copper alloys, carbon steels, austenitic stainless steels.  
Further material details see ISO 11114.  
All regulations and local requirements for the storage of containers have to be respected.  
Unsuitable materials: Aluminium alloys.

##### ! Advice on storage compatibility

Do not store together with spontaneously flammable materials.  
Do not store together with combustible liquids or combustible solids.  
Do not store together with animal feedstuff.  
Do not store together with explosives.  
Do not store together with infectious substances.  
Do not store together with radioactive material.  
Do not store together with toxic liquids or toxic solids.  
Do not store together with food.  
Do not store together with oxidizing agents.

##### ! Further information on storage conditions

Protect from heat and direct solar radiation.

#### 7.3. Specific end use(s)

##### ! Recommendation(s) for intended use

Exposure scenarios (ES) see annex to this safety data sheet.

## ! SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

#### ! Ingredients with occupational exposure limits to be monitored

CAS No	Name	Code	[mg/m <sup>3</sup> ]	[ppm]	Remark
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**Ingredients with occupational exposure limits to be monitored (continued)**

CAS No	Name	Code	[mg/m3]	[ppm]	Remark
74-87-3	Chloromethane; Methyl chloride	8 hours	105	50	EH40, UK
		Short-term	210	100	

**DNEL-/PNEC-values**

**DNEL worker**

CAS No	Substance name	Value	Code	Remark
74-87-3	Chloromethane (Methyl chloride)	12,5 mg/ m3	DNEL long-term inhalative (systemic)	Assessment factor 12,5

**PNEC**

CAS No	Substance name	Value	Code	Remark
74-87-3	Chloromethane (Methyl chloride)	0,02 mg/l	PNEC aquatic, marine water	Assessment factor 10000, assessment factor.
		0,098 mg/ kg dw	PNEC sediment, marine water	Extrapolation
		0,98 mg/ kg dw	PNEC sediment, freshwater	Extrapolation
		0,14 mg/ kg dw	PNEC soil	Extrapolation
		0,3 mg/l	PNEC sewage treatment plant (STP)	assessment factor.
		0,2 mg/l	PNEC aquatic, freshwater	Assessment factor 1000, assessment factor.
		2 mg/l	PNEC aquatic, intermittent release	Assessment factor 100, assessment factor.

**8.2. Exposure controls**

**! Respiratory protection**

Breathing apparatus in the event of high concentrations.  
Keep self contained breathing apparatus readily available for emergency use.  
Do not use any filter apparatus.  
Respiratory protection complying with EN 137.

In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation due to displacement of oxygen

**! Hand protection**

Safety gloves according to EN 374.  
Glove material specification [make/type, thickness, permeation time/life, wetting resistance]: IIR, >= 0,5 mm, > 10 min

**Eye protection**

Protective goggles according to EN 166, in case of increased risk add protective face shield.

**Other protection measures**

Safety shoes with steel toecap.  
Body covering work clothing or chemical resistant suit at increased risk.

**Appropriate engineering controls**

Transfer and handle only in enclosed systems.

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**! SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties****Appearance**

Gaseous / liquefied under pressure.

**Colour**

colourless

**Odour**

ethereal

**Odour threshold**

not determined

**Important health, safety and environmental information**

	Value	Temperature	at	Method	Remark
<b>pH value</b>	not applicable				
<b>Acid number</b>	not applicable				
<b>boiling point</b>	-23,8 °C				
<b>melting point</b>	-97,4 °C				
<b>Flash point</b>	not applicable				
<b>Vapourisation rate</b>	not determined				
<b>Flammable (solid)</b>	not applicable				
<b>Flammability (gas)</b>	inflammable				
<b>Ignition temperature</b>	625 °C				
<b>Self ignition temperature</b>	632 °C				
<b>Lower explosion limit</b>	7,6 Vol-%				
<b>Upper explosion limit</b>	19 Vol-%				
<b>Vapour pressure</b>	4900 hPa	20 °C			
<b>Relative density</b>	2,3065 kg/m <sup>3</sup>	0 °C	1013 mbar		
<b>Vapour density</b>	1,78				air = 1
<b>Solubility in water</b>	5 g/l	20 °C	1013 mbar		
<b>Solubility/other</b>					soluble in most organic solvents
<b>Partition coefficient n-octanol/water (log P O/W)</b>	0,91				



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	Value	Temperature	at	Method	Remark
<b>Decomposition temperature</b>	not determined				
<b>Viscosity</b>	not applicable				
<b>Oxidising properties</b>	no				
<b>Explosive properties</b>	no				
<b>9.2. Other information</b>	Vapours are heavier than air.				

**! SECTION 10: Stability and reactivity**

**10.1. Reactivity**

See section "Possibility of hazardous reactions".

**10.2. Chemical stability**

Stable under recommended conditions of use and storage (see section 7).

**10.3. Possibility of hazardous reactions**

Reactions with numerous chemical compounds.  
Reactions with strong oxidising agents.  
Reactions with oxygen.  
Reactions with alkali metals.  
Reactions with earth alkali metals.

**10.4. Conditions to avoid**

Heat sources / heat - risk of bursting.  
Sources of ignition.

**10.5. Incompatible materials**

**! Substances to avoid**

Acetylene  
boron trifluoride  
Bromine trifluoride  
Fluorine  
Aluminium / Aluminium alloys.

**10.6. Hazardous decomposition products**

Hydrogen chloride (HCl)  
Chlorine

**Thermal decomposition**

Remark No decomposition if used as directed.

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**! SECTION 11: Toxicological information**

**11.1. Information on toxicological effects**

**Acute toxicity/Irritation/Sensitization**

	Value/Validation	Species	Method	Remark
<b>LD50 acute oral</b>	Study technically not feasible.			
<b>LD50 acute dermal</b>	Study technically not feasible.			
<b>LC50 acute inhalation</b>	> 21800 mg/m <sup>3</sup> (4 h)	rat (male / female)	OECD 403	
<b>Skin irritation</b>	Study technically not feasible.			
<b>Eye irritation</b>	Study technically not feasible.			
<b>Skin sensitization</b>	Study technically not feasible.			
<b>Sensitization respiratory system</b>	not determined			

**Subacute Toxicity - Carcinogenicity**

	Value	Species	Method	Validation
<b>Chronic Toxicity</b>	NOAEC 465 mg/m <sup>3</sup> (2 a) Inhalation 6 h/d, 5 d/w	Rats and Mice.	OECD 453	
<b>Mutagenicity</b>				Indications on genotoxicity in vivo and in vitro available.
<b>Reproduction-Toxicity</b>	NOAEC 310 mg/kg  Inhalation.	Rat (male / female)	OECD 416	Indications of toxic effects are available from reproduction studies in animals.
<b>Carcinogenicity</b>	NOAEC 2065 mg/m <sup>3</sup> (1 a)  Inhalation. 6 h/d, 5 d/w	Rat (male / female)	OECD 453	Indications of possible carcinogenic effects in animal studies are available.

**! Specific target organ toxicity (single exposure)**

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

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#### Specific target organ toxicity (repeated exposure)

May cause damage to central nervous system, urogenital tract and liver through prolonged or repeated exposure by inhalation.

#### ! Aspiration hazard

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

#### ! Experiences made from practice

May be absorbed through the skin.

Risk of strong health injuries in case of long-term exposition.

May cause frostbite.

Inhalation causes narcotic effect/intoxication.

## ! SECTION 12: Ecological information

### 12.1. Toxicity

#### Ecotoxicological effects

	Value	Species	Method	Validation
<b>Fish</b>	LC50 270 mg/l (96 h)	Menicia beryllina		
<b>Daphnia</b>	EC50 200 mg/l (48 h)	Daphnia magna		
<b>Algae</b>	TTC 550 mg/l (168 h)	Microcystis aeruginosa (Blualge)		
<b>Bacteria</b>	TTC 500 mg/l (24 h)	Pseudomonas putida		

### 12.2. Persistence and degradability

	Elimination rate	Method of analysis	Method	Validation
<b>Biological degradability</b>				readily degradable

### 12.3. Bioaccumulative potential

Bioaccumulation improbable.

Because of the n-octanol/water distribution coefficient (log K o/w) accumulation in organisms is not expected.

### 12.4. Mobility in soil

High mobility

Adsorption in soil is not likely.

### 12.5. Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

### 12.6. Other adverse effects

ODP: 0,02

GWP: 13

### General regulation

Avoid release to the environment.

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## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

#### Waste code No.

16 05 04\*

#### Name of waste

gases in pressure containers (including halons) containing hazardous substances

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 2008/98/EC on hazardous waste.

#### Recommendations for the product

Dispose of as hazardous waste.

#### Recommendations for packaging

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

## ! SECTION 14: Transport information

	ADR/RID	IMDG	IATA-DGR
14.1. UN number	1063	1063	1063
14.2. UN proper shipping name	METHYL CHLORIDE	METHYL CHLORIDE	Methyl chloride
14.3. Transport hazard class(es)	2.1	2.1	2.1
14.4. Packing group	-	-	-
14.5. Environmental hazards	No	No	No

### 14.6. Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

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

not applicable

No transport as bulk according IBC - Code.

#### Land and inland navigation transport ADR/RID

Hazard label(s) 2.1

Tunnel restriction code B/D

Classification code 2F

#### Marine transport IMDG

Ems: F-D, S-U

#### Air transport ICAO/IATA-DGR

Cargo aircraft only: Package max. 150 kg.

## ! SECTION 15: Regulatory information

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

#### Other regulations (EU)

Regulation (EU) No. 1005/2009 concerning materials, which cause damage to the ozone layer.

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Annex XVII No 40.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.

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#### VOC standard

##### VOC content

$\geq 99,9\%$  20 °C 4900 hPa

#### 15.2. Chemical Safety Assessment

For this substance a chemical safety assessment has been carried out.

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## SECTION 16: Other information

#### Recommended uses and restrictions

National and local regulations concerning chemicals shall be observed.

#### Further information

All declarations of safety-data-sheet refer to pure substance.

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

Indication of changes: "!" = Data changed compared with the previous version. Previous version: 16.0

#### Sources of key data used

For the preparation of this safety data sheet, information from our suppliers as well as data from the "database of registered substances" of the European Chemicals Agency (ECHA) and the "GESTIS Database of substances" were used.

**Annex: Exposure scenarios**

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**1. Short title of Exposure Scenario: Manufacture**

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Main User Groups	:	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3, SU 8,9: Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of bulk, large scale substances (including petroleum products); manufacture of fine chemicals
Environmental Release Categories	:	ERC1: Manufacture of the substance
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) PROC15: Use as laboratory reagent

**2.1 Contributing scenario controlling environmental exposure for: ERC1: Manufacture of the substance**

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**Amount used**

Annual site tonnage	:	99999 tonnes/year
Fraction of EU tonnage used in region:	:	100 %
Daily amount per site	:	333330 kg/day

**Environment factors not influenced by risk management**

Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

**Other given operational conditions affecting environmental exposure**

Number of emission days per year	:	300
Emission or Release Factor: Air	:	5 %
Emission or Release Factor: Water	:	0,00075 %
Emission or Release Factor: Soil	:	0,01 %

**Technical conditions and measures / Organizational measures**

Remarks	:	Organizational measures to prevent/limit release from the site
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**2.2 Contributing scenario controlling worker exposure for: PROC1: Use in closed process, no likelihood of exposure**

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**Product characteristics**

Physical Form (at time of use)	:	Liquefied gas
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**Frequency and duration of use**

Frequency of use	:	> 4 hours/day
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**Annex: Exposure scenarios**

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**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

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**2.3 Contributing scenario controlling worker exposure for: PROC2,: Use in closed, continuous process with occasional controlled exposure, Option 1**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure):  $\geq 90\%$ )

---

**2.4 Contributing scenario controlling worker exposure for: PROC2,: Use in closed, continuous process with occasional controlled exposure, Option 2**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 15 - 60 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

---

**2.5 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 1**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

**Annex: Exposure scenarios**

---

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

---

**2.6 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 2**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure): >= 90 %)

---

**2.7 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 3**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure): >= 90 %)

---

**2.8 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 4**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : < 15 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented



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**2.9 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent**

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 15 - 60 minutes

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

**3. Exposure estimation and reference to its source**

**Environment**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	ECETOC TRA		Fresh water		0,0051 mg/L	0,0255
			Fresh water sediment		0,0342 mg/kg dry weight	0,0348
			Marine water		0,0125 mg/L	0,625
			Marine sediment		0,0839 mg/kg dry weight	0,853
			Sewage treatment plant		0,051 mg/L	0,170
			Soil		0,0544 mg/kg dry weight	0,384

**Workers**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA worker v3		Worker - inhalative, long-term - systemic	0,015 mg/m <sup>3</sup>	0,001
PROC2	ECETOC TRA worker v3	Option 1	Worker - inhalative, long-term - systemic	2,229 mg/m <sup>3</sup>	0,178
PROC2	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	7,429 mg/m <sup>3</sup>	0,594

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PROC3	ECETOC TRA worker v3	Option 1	Worker - inhalative, long-term - systemic	6,368 mg/m <sup>3</sup>	0,509
PROC3	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	6,368 mg/m <sup>3</sup>	0,509
PROC3	ECETOC TRA worker v3	Option 3	Worker - inhalative, long-term - systemic	4,457 mg/m <sup>3</sup>	0,357
PROC3	ECETOC TRA worker v3	Option 4	Worker - inhalative, long-term - systemic	7,429 mg/m <sup>3</sup>	0,594
PROC15	ECETOC TRA worker v3	Quality control of samples	Worker - inhalative, long-term - systemic	2,123 mg/m <sup>3</sup>	0,170

ERC1: Manufacture of the substance

PROC1: Use in closed process, no likelihood of exposure

PROC15: Use as laboratory reagent

PROC2: Use in closed, continuous process with occasional controlled exposure

PROC3: Use in closed batch process (synthesis or formulation)

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**Annex: Exposure scenarios**

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**1. Short title of Exposure Scenario: Intermediate**

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Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	: SU 3, SU8, SU9, SU11: Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals, Manufacture of rubber products
Environmental Release Categories	: ERC6a: Use of intermediate
Chemical product category	: PC19: Intermediate PC21: Laboratory chemicals
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) PROC15: Use as laboratory reagent

**2.1 Contributing scenario controlling environmental exposure for: ERC6a: Use of intermediate**

---

**Amount used**

Annual site tonnage	: 124999 tonnes/year
Fraction of EU tonnage used in region:	: 100 %
Daily amount per site	: 416663 kg/day

**Environment factors not influenced by risk management**

Dilution Factor (River)	: 10
Dilution Factor (Coastal Areas)	: 100

**Other given operational conditions affecting environmental exposure**

Number of emission days per year	: 300
Emission or Release Factor: Air	: 5 %
Emission or Release Factor: Water	: 0,0006 %
Emission or Release Factor: Soil	: 0,01 %

**Technical conditions and measures / Organizational measures**

Remarks : Organizational measures to prevent/limit release from the site

**2.2 Contributing scenario controlling worker exposure for: PROC1,; Use in closed process, no likelihood of exposure, Option 1**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

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**Frequency and duration of use**

Frequency of use : > 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

---

**2.3 Contributing scenario controlling worker exposure for: PROC1, Use in closed process, no likelihood of exposure, Option 2**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : > 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

---

**2.4 Contributing scenario controlling worker exposure for: PROC2, Use in closed, continuous process with occasional controlled exposure, Option 1**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure):  $\geq 90\%$ )

---

**2.5 Contributing scenario controlling worker exposure for: PROC2, Use in closed, continuous process with occasional controlled exposure, Option 2**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : > 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor



**Annex: Exposure scenarios**

---

Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

---

**2.6 Contributing scenario controlling worker exposure for: PROC2,: Use in closed, continuous process with occasional controlled exposure, Option 3**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 15 - 60 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

---

**2.7 Contributing scenario controlling worker exposure for: PROC2,: Use in closed, continuous process with occasional controlled exposure, Option 4**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure):  $\geq 90$  %)

---

**2.8 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 1**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

## Annex: Exposure scenarios

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### Technical conditions and measures

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

---

## 2.9 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 1

---

### Product characteristics

Physical Form (at time of use) : Liquefied gas

### Frequency and duration of use

Frequency of use : 1 - 4 hours/day

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure): >= 90 %)

---

## 2.10 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 3

---

### Product characteristics

Physical Form (at time of use) : Liquefied gas

### Frequency and duration of use

Frequency of use : 1 - 4 hours/day

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure): >= 90 %)

---

## 2.11 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 4

---

### Product characteristics

Physical Form (at time of use) : Liquefied gas

### Frequency and duration of use

Frequency of use : < 15 minutes/day

### Other operational conditions affecting workers exposure

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

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**2.12 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent**

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 15 - 60 minutes

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

**3. Exposure estimation and reference to its source**

**Environment**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC6a	ECETOC TRA		Fresh water		0,0051 mg/L	0,0255
			Fresh water sediment		0,0342 mg/kg dry weight	0,0348
			Marine water		0,0125 mg/L	0,625
			Marine sediment		0,0839 mg/kg dry weight	0,853
			Sewage treatment plant		0,0510 mg/L	0,170
			Soil		0,0686 mg/kg dry weight	0,482

**Workers**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA worker v3	Option 1	Worker - inhalative, long-term - systemic	0,021 mg/m <sup>3</sup>	0,002
PROC1	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	0,015 mg/m <sup>3</sup>	0,001
PROC2	ECETOC TRA v2.0 Worker	Option 1	Worker - inhalative,	3,184 mg/m <sup>3</sup>	0,255

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			long-term - systemic		
PROC2	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	5,306 mg/m <sup>3</sup>	0,425
PROC2	ECETOC TRA worker v3	Option 3	Worker - inhalative, long-term - systemic	7,429 mg/m <sup>3</sup>	0,594
PROC2	ECETOC TRA worker v3	Option 4	Worker - inhalative, long-term - systemic	mg/m <sup>3</sup>	0,178
PROC3	ECETOC TRA worker v3	Option 1	Worker - inhalative, long-term - systemic	6,368 mg/m <sup>3</sup>	0,509
PROC3	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	6,368 mg/m <sup>3</sup>	0,509
PROC3	ECETOC TRA worker v3	Option 3	Worker - inhalative, long-term - systemic	4,457 mg/m <sup>3</sup>	0,357
PROC3	ECETOC TRA worker v3	Option 4	Worker - inhalative, long-term - systemic	7,429 mg/m <sup>3</sup>	0,594
PROC15	ECETOC TRA worker v3		Worker - inhalative, long-term - systemic	2,123 mg/m <sup>3</sup>	0,170

ERC6a: Use of intermediate

PROC1: Use in closed process, no likelihood of exposure

PROC15: Use as laboratory reagent

PROC2: Use in closed, continuous process with occasional controlled exposure

PROC3: Use in closed batch process (synthesis or formulation)



**Annex: Exposure scenarios**

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**1. Short title of Exposure Scenario: Laboratory Reagents**

---

Main User Groups	: SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	: SU22, SU24: Public domain (administration, education, entertainment, services, craftsmen), Scientific research and development
Environmental Release Categories	: ERC8b, ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, indoor), Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)
Chemical product category	: PC21: Laboratory chemicals
Process categories	: PROC3: Use in closed batch process (synthesis or formulation) PROC15: Use as laboratory reagent

**2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, indoor), Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)**

---

**Amount used**

Annual site tonnage	: 999 tonnes/year
Fraction of EU tonnage used in region:	: 10 %
Daily amount per site	: 2737 kg/day

**Environment factors not influenced by risk management**

Dilution Factor (River)	: 10
Dilution Factor (Coastal Areas)	: 100

**Other given operational conditions affecting environmental exposure**

Number of emission days per year	: 365
Emission or Release Factor: Air	: 0,1 %
Emission or Release Factor: Water	: 2 %
Emission or Release Factor: Soil	: 0 %

**2.2 Contributing scenario controlling worker exposure for: PROC3, Use in closed batch process (synthesis or formulation), Option 1**

---

**Product characteristics**

Physical Form (at time of use)	: Liquefied gas
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**Frequency and duration of use**

Frequency of use	: 1 - 4 hours/day
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**Annex: Exposure scenarios**

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**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

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

Wear respiratory protection. (Effectiveness (of a measure): >= 90 %)

---

**2.3 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 2**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 15 - 60 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure): >= 90 %)

---

**2.4 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 3**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : < 15 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

---

**2.5 Contributing scenario controlling worker exposure for: PROC3,: Use in closed batch process (synthesis or formulation), Option 4**

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**Product characteristics**

Physical Form (at time of use) : Liquefied gas

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**Annex: Exposure scenarios****Frequency and duration of use**

Frequency of use : 15 - 60 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Conditions and measures related to personal protection, hygiene and health evaluation**Wear respiratory protection. (Effectiveness (of a measure):  $\geq 90\%$ )**2.6 Contributing scenario controlling worker exposure for: PROC15: Use as laboratory reagent****Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 15 - 60 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor

Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

**3. Exposure estimation and reference to its source****Environment**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8b	ECETOC TRA		Fresh water		0,0000237 mg/L	0,000118
			Fresh water sediment		0,000159 mg/kg dry weight	0,000162
			Marine water		0,0000023 mg/L	0,000117
			Marine sediment		0,0000157 mg/kg dry weight	0,000160
			Sewage treatment plant		0,000223 mg/L	0,000745
			Soil		0,0000083 mg/kg dry weight	0,000059

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**Workers**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC3	ECETOC TRA worker v3	Option 1	Worker - inhalative, long-term - systemic	2,547 mg/m <sup>3</sup>	0,204
PROC3	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	4,245 mg/m <sup>3</sup>	0,340
PROC3	ECETOC TRA worker v3	Option 3	Worker - inhalative, long-term - systemic	4,245 mg/m <sup>3</sup>	0,340
PROC3	ECETOC TRA worker v3	Option 4	Worker - inhalative, long-term - systemic	2,972 mg/m <sup>3</sup>	0,238
PROC15	ECETOC TRA worker v3		Worker - inhalative, long-term - systemic	4,245 mg/m <sup>3</sup>	0,340

ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor)  
ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor)  
PROC15: Use as laboratory reagent  
PROC3: Use in closed batch process (synthesis or formulation)

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**Annex: Exposure scenarios**

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**1. Short title of Exposure Scenario: Use as industrial solvent.**

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Main User Groups	:	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	SU 3, SU11: Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of rubber products
Environmental Release Categories	:	ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
Chemical product category	:	PC35: Washing and cleaning products PC40: Extraction agents
Process categories	:	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure

**2.1 Contributing scenario controlling environmental exposure for: ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)**

---

**Amount used**

Annual site tonnage	:	999 tonnes/year
Fraction of EU tonnage used in region:	:	100 %
Daily amount per site	:	49950 kg/day

**Environment factors not influenced by risk management**

Dilution Factor (River)	:	10
Dilution Factor (Coastal Areas)	:	100

**Other given operational conditions affecting environmental exposure**

Number of emission days per year	:	20
Emission or Release Factor: Air	:	100 %
Emission or Release Factor: Water	:	0,005 %
Emission or Release Factor: Soil	:	5 %

**Technical conditions and measures / Organizational measures**

Remarks	:	Organizational measures to prevent/limit release from the site
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**2.2 Contributing scenario controlling worker exposure for: PROC1, : Use in closed process, no likelihood of exposure, Option 1**

---

**Product characteristics**

Physical Form (at time of use)	:	Liquefied gas
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**Frequency and duration of use**

Frequency of use	:	> 4 hours/day
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**Annex: Exposure scenarios**

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**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

---

**2.3 Contributing scenario controlling worker exposure for: PROC1, Use in closed process, no likelihood of exposure, Option 2**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : > 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

---

**2.4 Contributing scenario controlling worker exposure for: PROC2, Use in closed, continuous process with occasional controlled exposure, Option 1**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure):  $\geq 90\%$ )

---

**2.5 Contributing scenario controlling worker exposure for: PROC2, Use in closed, continuous process with occasional controlled exposure, Option 2**

---

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : > 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Indoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

**Technical conditions and measures**

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**Annex: Exposure scenarios**

Provide extraction ventilation at points where emissions occur. (Effectiveness (of a measure): 90 %)

**2.6 Contributing scenario controlling worker exposure for: PROC2,: Use in closed, continuous process with occasional controlled exposure, Option 3**

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 15 - 60 minutes/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

**2.7 Contributing scenario controlling worker exposure for: PROC2,: Use in closed, continuous process with occasional controlled exposure, Option 4**

**Product characteristics**

Physical Form (at time of use) : Liquefied gas

**Frequency and duration of use**

Frequency of use : 1 - 4 hours/day

**Other operational conditions affecting workers exposure**

Outdoor / Indoor : Outdoor  
Remarks : Assumes a good basic standard of occupational hygiene is implemented

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

Wear respiratory protection. (Effectiveness (of a measure):  $\geq 90$  %)

**3. Exposure estimation and reference to its source**

**Environment**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	ECETOC TRA		Fresh water		0,0051 mg/L	0,0255
			Fresh water sediment		0,0342 mg/kg dry weight	0,0348
			Marine water		0,0125 mg/L	0,625
			Marine sediment		0,0839 mg/kg dry weight	0,853
			Sewage treatment plant		0,0510 mg/L	0,170
			Soil		0,0124 mg/kg dry weight	0,0883

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**Annex: Exposure scenarios**

**Workers**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA worker v3	Option 1	Worker - inhalative, long-term - systemic	0,021 mg/m <sup>3</sup>	0,002
PROC1	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	0,015 mg/m <sup>3</sup>	0,001
PROC2	ECETOC TRA worker v3	Option 1	Worker - inhalative, long-term - systemic	3,184 mg/m <sup>3</sup>	0,255
PROC2	ECETOC TRA worker v3	Option 2	Worker - inhalative, long-term - systemic	5,306 mg/m <sup>3</sup>	0,425
PROC2	ECETOC TRA worker v3	Option 3	Worker - inhalative, long-term - systemic	7,429 mg/m <sup>3</sup>	0,594
PROC2	ECETOC TRA worker v3	Option 4	Worker - inhalative, long-term - systemic	2,229 mg/m <sup>3</sup>	0,178

ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

PROC1: Use in closed process, no likelihood of exposure

PROC2: Use in closed, continuous process with occasional controlled exposure