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

1.1. Product identifier

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

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

Identified uses

Sector of uses [SU]
SU10 - Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
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

! **Process categories [PROC]**
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)
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC15 - Use as laboratory reagent

! **Environmental release categories [ERC]**
ERC1 - Manufacture of substances
ERC8b - Wide dispersive indoor use of reactive substances in open systems
ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

Uses advised against

Remark
Do not use for private purposes (household).

Recommended intended purpose(s)
Basic substance.

1.3. Details of the supplier of the safety data sheet

Manufacturer/distributor	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 hamburg@ghc.de Internet www.ghc.de

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 (Poison Control Centre) 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
Flam. Gas 1	**H220**	
Liquef. Gas	**H280**	
Carc. 2	**H351**	
Repr. 2	**H361**	
STOT RE 2	**H373**	

Hazard statements for physical hazards

H220	**Extremely flammable gas.**
H280	**Contains gas under pressure; may explode if heated.**

Hazard statements for health hazards

H351	**Suspected of causing cancer by inhalation.**
H361	**Suspected of damaging fertility and the unborn child by inhalation.**
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

H220	**Extremely flammable gas.**
H280	**Contains gas under pressure; may explode if heated.**

Hazard statements for health hazards

H351	**Suspected of causing cancer by inhalation.**
H361	**Suspected of damaging fertility and the unborn child by inhalation.**
H373	**May cause damage to central nervous system, urogenital tract and liver through prolonged or repeated exposure by inhalation.**

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 breathe 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	Eliminate all ignition sources if safe to do so.

Storage

P403	Store in a well-ventilated place.

Hazardous ingredients for labeling
Chloromethane (Methyl chloride)

2.3. Other hazards
Adverse physicochemical effects
In the case of insufficient ventilation and/or through the formation of a explosive/highly flammable mixture is possible.

Adverse human health effects and symptoms
Contact with liquid may cause cold burns/frostbite.
Asphyxiant in high concentrations.

Information pertaining to special dangers for human and environment
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

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

SECTION 3: Composition/ information on ingredients

3.1. Substances
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

! 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 casualty 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 registrated trademarks).
Seek medical treatment immediately.
In case of respiratory standstill give artifical respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

! **In case of skin contact**
In case of contact with skin wash off with warm water.
In case of frostbite rinse with plenty of water. Don`t remove clothing.
In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Do not remove clothing frozen to the skin. Thaw it with lukewarm water. Apply a sterile dressing. Obtain medical assistance.

In case of eye contact
Rinse cautiously with water for several minuts. 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
The following symptoms may occur in case of strong exposition:
Eye defects
Unconsciousness
Cardiac arrhythmia (disordered cardiac rhythm).
Delirious state
vomiting
Headache
Nausea
Confusion
Trembling, clouded awareness, convulsions with delay of several hours
Dizziness
Contact with liquid may cause cold burns/frostbite.

Physician's information / possible dangers
Risk of cardiac rhythm disturbances
Risk of deterioration due to consumption of alcohol.
Risk of reduced reactions (sedative)

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.
Symptoms may not occur until several hours.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media
Foam
Dry powder
Carbon dioxide
Water spray jet

Unsuitable extinguishing media
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 air.
In the event of fire the following can be released:
Carbon monoxide (CO)
Hydrogen chloride (HCl)
Phosgene

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 containers to rupture / explode.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur.
Extinguish any other fire.

! SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
! **For non-emergency personnel**
Evacuate area.

! **For emergency responders**
Remove persons to safety.
Eliminate all ignition sources if safe to do so.
Keep away sources of ignition.

6.2. Environmental precautions
If possible, stop flow of product.
Eliminate ignition sources.
Do not discharge into the drains/surface waters/groundwater.
Prevent spread over a wide area (e.g. by containment or oil barriers).
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

! 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.
The working pressure in the receptacle must not exceed 2/3 of the test pressure of the pressure receptacle.
Take measures against electrostatically charging.
Barrels and installations thoroughly earthing (grounding).
Treatment only in suitable rooms and systems.
Provide good room ventilation even at ground level (vapours are heavier than air).
Prevent cylinders from falling over.
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 backfeed into the container.
Suck back 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.

Hygiene measures
At work do not eat, drink and smoke.

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.
Take precautionary measures against static discharges.
Formation of explosive gas mixtures in 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.
Use transportable pressure equipment.
Suitable materials: Normalised steel and carbon steel, tempered steel, stainless steel.
Valve: Suitable materials: Brass, copper alloys, carbon steels, stainless steel.
Unsuitable materials: Aluminium alloys.

Advice on storage compatibility
Do not store with spontaneously flammable materials.
Do not store together with combustible liquids or combustible solids.
Do not store together with animal feedstuffs.
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 liquids or oxidizing solids.

Further information on storage conditions
Ensure valve protection device is correctly fitted.
Keep container tightly closed and store at cool and aired place.
Prevent cylinders from falling over.
Protect of heat.
Storage temperature may not exceed 50°C (=122°F).

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/m3]	[ppm]	Remark
74-87-3	Chloromethane	WEL, 8 hours Short-term	105 210	50 100	UK
74-87-3	Methyl chloride	PEL, 8 hours Short-term		100 200	USA, OSHA

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, Extrapolation

PNEC

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

8.2. Exposure controls

Respiratory protection
Keep self contained breathing apparatus readily available for emergency use.
Do not use any filter apparatus.
In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation by edging out of air oxygen

! **Hand protection**
Leather gloves
Safety gloves according EN 388
Glove material specification [make/type, thickness, permeation time/life]: IIR, >= 0,5 mm, > 8 min

! **Eye protection**
Safety goggles, in case of increased risk add protective face shield
Safety goggles with side protection complying with EN 166.

Other protection measures
Safety shoes with steel toe.
Body covering work clothing, or chemical resistant suit at increased risk.

Appropriate engineering controls
Transfer and handle only in enclosed systems.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Colour	Odour
Gaseous / liquefied under pressure.	colourless	sweetish

Odour threshold
10 ppm / 21 mg/m³

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value	not applicable				
boiling point	-24 °C		1013 hPa		
melting point	-97,7 °C				
Flash point	< -24 °C			DIN 51755	
Vapourisation rate					No data available
Flammable (solid)	not applicable				
Flammability (gas)					flammable.
Ignition temperature	625 °C			DIN 51794	
Self ignition temperature	not determined				
Lower explosion limit	7,1 Vol-%				
Upper explosion limit	18,5 Vol-%				
Vapour pressure	4900 hPa	20 °C			
Relative density	921 kg/m3	20 °C	4900 hPa		information concerns to liquid phase
Bulk density	not applicable				
Vapour density	1,785				air = 1
Solubility in water	5,32 g/l	25 °C	1013 mbar		
Solubility/other					soluble in most organic solvents
Partition coefficient n-octanol/water (log P O/W)	0,91				
Decomposition temperature	not determined				
Viscosity dynamic	0,18 mPa*s	20 °C			information concerns to liquid phase

	Value	Temperature	at	Method	Remark
Viscosity dynamic	0,14 mPa*s	50 °C			information concerns to liquid phase

Oxidising properties
no

Explosive properties
no

9.2. Other information
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 normal conditions.

10.3. Possibility of hazardous reactions
May react violently with oxidants.

10.4. Conditions to avoid
Formation of explosive gas/air mixtures.
Heat sources / heat - risk of bursting.

10.5. Incompatible materials
! **Substances to avoid**
Air, oxidiser.
Zinc.
Water / moisture.
Alkali metals.
Earth alkali metals.
Aluminium / Aluminium alloys.

10.6. Hazardous decomposition products
Hydrogen chloride (HCl)
Chlorine
Phosgene

Thermal decomposition

Remark No decomposition below 400°C.

! SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity/Irritation/Sensitization

	Value/Validation	Species	Method	Remark
LD50 acute oral	No information available.			
LD50 acute dermal	No information available.			
LC50 acute inhalation	> 21800 mg/m3 (4 h)	rat (male / female)	OECD 403	
Skin irritation	non-irritant			
Eye irritation	non-irritant			
Skin sensitization	not determined			
Sensitization respiratory system	not determined			

Subacute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Chronic Toxicity	NOAEC 465 mg/m3 (2 a) Inhalation 6 h/d, 5 d/w	Rats and Mice.	OECD 453	Target organs: liver, urinary tract, testis, epididymis (rats). Disorders of the nervous system (mice). Neoplastic lesions, renal tubuloepithelial hyperplasia, karyomegaly (male mice).
Mutagenicity				Information on genotoxicity in vivo and in vitro available.
Reproduction-Toxicity	NOAEC 310 mg/m3 Inhalation. Information concerns to ethylene oxide.	Rat	OECD 416	Indications of toxic effects are available from reproduction studies in animals.
Carcinogenicity	NOAEC 2065 mg/m3 (2 a) Einatmen (Inhalation). 6 h/d, 5 d/w	Rat	OECD 453	The existing data do not justify a classification as a carcinogen.

Specific target organ toxicity (single exposure)
no

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
not applicable

Experiences made from practice
May be absorbed through the skin.
May cause frostbite.
Gases have a suffocating effect.
Inhalation causes narcotic effect/intoxication.

SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicological effects

	Value	Species	Method	Validation
Fish	LC50 270 mg/l (96 h)	Menicia beryllina		
Daphnia	EC50 200 mg/l (48 h)	Daphnia magna	OECD 202	
Algae	TTC 550 mg/l (168 h)	Microcystis aeruginosa (Blaualge)		
Bacteria	TTC 500 mg/l (24 h)	Pseudomonas putida		

12.2. Persistence and degradability

	Elimination rate	Method of analysis	Method	Validation
Physico-chemical degradability	At normal temperature very highly volatile or gaseous product that can be released to atmosphere. Elimination test cannot be employed.			
Biological degradability				readily degradable
Degradability				readily degradable
Biological eliminability	not determined			

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

12.4. Mobility in soil
Adsorption in the 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.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste code No.	Name of waste
16 05 04*	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
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

! 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.

VOC standard

VOC content	>=99,9 %	20 °C	4900 hPa

15.2. Chemical Safety Assessment
For this substance a chemical safety assessment has been carried out.
Exposure scenarios (ES) see annex to this safety data sheet.

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: 14.1

Annex: Exposure scenarios

Annex :

Manufacture

Intermediate

Laboratory Reagents

Use as Process chemical

1. Short title of Exposure Scenario: Manufacture

Main User Groups	:	**SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites**
Sectors of end-use	:	**SU8: Manufacture of bulk, large scale chemicals (including petroleum products)**
Environmental Release Categories	:	**ERC1: Manufacture of substances**
Chemical product category	:	**PC19: Intermediate**
Process categories	:	**PROC1: Use in closed process, no likelihood of exposure** **PROC2: Use in closed, continuous process with occasional controlled exposure** **PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities** **PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)** **PROC15: Use as laboratory reagent**

2.1 Contributing scenario controlling environmental exposure for: ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1: Manufacture of substances

Technical conditions and measures / Organizational measures

Remarks	:	**Product does not cause relevant environmental release.**

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

Product characteristics

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

Frequency and duration of use

Duration of the acitivity	:	**> 240 min**
Remarks	:	**Covers frequency up to: daily use, weekly, monthly, yearly.**

Other operational conditions affecting workers exposure
Outdoor / Indoor : Outdoor
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

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

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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

Activity : Loading/unloading operations
Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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 %)

2.5 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Activity : Refilling step
Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : **> 240 min**
Remarks : **Covers frequency up to: daily use, weekly, monthly, yearly.**

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 %)

2.6 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Activity : **Refilling step**
Product characteristics
Physical Form (at time of use) : **Liquefied gas**

Frequency and duration of use
Duration of the acitivity : **> 240 min**
Remarks : **Covers frequency up to: daily use, weekly, monthly, yearly.**

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 %)

2.7 Contributing scenario controlling worker exposure for: PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Activity : **Refilling step**
Product characteristics
Physical Form (at time of use) : **Liquefied gas**

Frequency and duration of use
Duration of the acitivity : **15 - 60 min**

Other operational conditions affecting workers exposure
Outdoor / Indoor : **Outdoor**
Remarks : **Assumes a good basic standard of occupational hygiene is implemented.**

2.8 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
Duration of the acitivity : **> 240 min**
Remarks : **Covers frequency up to: daily use, weekly, monthly, yearly.**

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

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker		Chronic inhalation systemic exposure	0.015 mg/m3	0.0001
PROC2	ECETOC TRA v2.0 Worker		Chronic inhalation systemic exposure	73.628 mg/m3	0.7363
PROC8b	ECETOC TRA v2.0 Worker	Loading/unloading operations	Chronic inhalation systemic exposure	22.088 mg/m3	0.2209
PROC9	ECETOC TRA v2.0 Worker	Refilling step	Chronic inhalation systemic exposure	42.073 mg/m3	0.4207
PROC9	ECETOC TRA v2.0 Worker	Refilling step	Chronic inhalation systemic exposure	29.451 mg/m3	0.2945
PROC9	ECETOC TRA v2.0 Worker	Refilling step	Chronic inhalation	59.902 mg/m3	0.5890

			systemic exposure		
PROC15	ECETOC TRA v2.0 Worker	Quality control of samples	Chronic inhalation systemic exposure	10.518 mg/m3	0.1052

PROC1: Use in closed process, no likelihood of exposure
PROC15: Use as laboratory reagent
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

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

1. Short title of Exposure Scenario: Intermediate

Main User Groups	:	**SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites**
Sectors of end-use	:	**SU8, SU11: Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of rubber products**
Environmental Release Categories	:	**ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)**
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)** **PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities** **PROC15: Use as laboratory reagent**

2.1 Contributing scenario controlling environmental exposure for: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Technical conditions and measures / Organizational measures

Remarks	:	**Product does not cause relevant environmental release.**

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

Product characteristics

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

Frequency and duration of use

Duration of the acitivity	:	**> 240 min**
Remarks	:	**Covers frequency up to: daily use, weekly, monthly, yearly.**

Other operational conditions affecting workers exposure

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

is implemented.
Outdoor / Indoor : Outdoor

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

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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)

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

Other operational conditions affecting workers exposure

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

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

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

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

Product characteristics

Physical Form (at time of use)	:	Liquefied gas

Frequency and duration of use

Duration of the acitivity	:	15 - 60 min

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

Product characteristics

Physical Form (at time of use)	:	Liquefied gas

Frequency and duration of use

Duration of the acitivity	:	> 240 min
Remarks	:	Covers frequency up to: daily use, weekly, monthly, yearly.

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

Product characteristics

Physical Form (at time of use)	:	Liquefied gas

Frequency and duration of use
Duration of the acitivity : 15 - 60 min

Other operational conditions affecting workers exposure
Outdoor / Indoor : Outdoor
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

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
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker	Indoor	Chronic inhalation systemic exposure	0.021 mg/m3	0.0002
PROC1	ECETOC TRA v2.0 Worker	Outdoor	Chronic inhalation systemic exposure	0.015 mg/m3	0.0001
PROC2	ECETOC TRA v2.0 Worker	Indoor	Chronic inhalation systemic exposure	10.518 mg/m3	0.1052
PROC2	ECETOC TRA	Outdoor	Chronic	73.628	0.7363

	v2.0 Worker		inhalation systemic exposure	mg/m3	
PROC3	ECETOC TRA v2.0 Worker	Indoor	Chronic inhalation systemic exposure	21.036 mg/m3	0.2104
PROC3	ECETOC TRA v2.0 Worker	Outdoor	Chronic inhalation systemic exposure	14.726 mg/m3	0.1473
PROC3	ECETOC TRA v2.0 Worker	Outdoor	Chronic inhalation systemic exposure	88.353 mg/m3	0.8835
PROC8b	ECETOC TRA v2.0 Worker	Loading/unloading operations	Chronic inhalation systemic exposure	22.088 mg/m3	0.2209
PROC8b	ECETOC TRA v2.0 Worker	Loading/unloading operations	Chronic inhalation systemic exposure	44.177 mg/m3	0.4418
PROC15	ECETOC TRA v2.0 Worker		Chronic inhalation systemic exposure	10.518 mg/m3	0.1052

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

No risk potential for the environmental compartments were determined, the PEC/PNEC ratio is < 1.

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

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	:	**SU24: Scientific research and development**
Environmental Release Categories	:	**ERC8b: Wide dispersive indoor use of reactive substances in open systems**
Chemical product category	:	**PC21: Laboratory chemicals**
Process categories	:	**PROC15: Use as laboratory reagent**

2.1 Contributing scenario controlling environmental exposure for: ERC8b: Wide dispersive indoor use of reactive substances in open systems

Technical conditions and measures / Organizational measures

Remarks	:	**Product does not cause relevant environmental release.**

2.2 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

Duration of the acitivity	:	**> 240 min**
Remarks	:	**Covers frequency up to: daily use, weekly, monthly, yearly.**

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

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC15	ECETOC TRA v2.0 Worker		Chronic inhalation systemic exposure	10.518 mg/m3	0.1052

PROC15: Use as laboratory reagent
No risk potential for the environmental compartments were determined, the PEC/PNEC ratio is < 1.

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

1. Short title of Exposure Scenario: Use as Process chemical

Main User Groups	:	**SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites**
Sectors of end-use	:	**SU11: Manufacture of rubber products**
Environmental Release Categories	:	**ERC4: Industrial use of processing aids in processes and products, not becoming part of articles**
Process categories	:	**PROC1: Use in closed process, no likelihood of exposure** **PROC2: Use in closed, continuous process with occasional controlled exposure** **PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities**

2.1 Contributing scenario controlling environmental exposure for: ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

Technical conditions and measures / Organizational measures

Remarks	:	**Product does not cause relevant environmental release.**

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

Product characteristics

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

Frequency and duration of use

Duration of the acitivity	:	**> 240 min**
Remarks	:	**Covers frequency up to: daily use, weekly, monthly, yearly.**

Other operational conditions affecting workers exposure

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

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

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : > 240 min
Remarks : Covers frequency up to: daily use, weekly, monthly, yearly.

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 %)

2.6 Contributing scenario controlling worker exposure for: PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Product characteristics
Physical Form (at time of use) : Liquefied gas

Frequency and duration of use
Duration of the acitivity : 15 - 60 min

Other operational conditions affecting workers exposure
Outdoor / Indoor : Outdoor
Remarks : Assumes a good basic standard of occupational hygiene is implemented.

3. Exposure estimation and reference to its source

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR
PROC1	ECETOC TRA v2.0 Worker	Indoor	Chronic inhalation systemic exposure	0.021 mg/m3	0.0002
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PROC2	ECETOC TRA v2.0 Worker	Indoor	Chronic inhalation systemic exposure	10.518 mg/m3	0.1052
PROC2	ECETOC TRA v2.0 Worker	Outdoor	Chronic inhalation systemic exposure	73.628 mg/m3	0.7363
PROC8b	ECETOC TRA v2.0 Worker	Loading/unloading operations	Chronic inhalation systemic exposure	22.088 mg/m3	0.2209
PROC8b	ECETOC TRA v2.0 Worker	Loading/unloading operations	Chronic inhalation systemic exposure	44.177 mg/m3	0.4418

PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

No risk potential for the environmental compartments were determined, the PEC/PNEC ratio is < 1.

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