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

* 1.1 Product identifier

Trade name/designation	Ethyl chloride
Art-Nr(n).	1200, 1205, 70120
Substance name	chloroethane
Index No	602-009-00-0
EC No	200-830-5
REACH No.	01-2119487479-17
CAS No	75-00-3

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

* **Sector of uses [SU]**
SU8 Manufacture of bulk, large scale chemicals (including petroleum products)
SU9 Manufacture of fine chemicals
SU11 Manufacture of rubber products

* **Process categories [PROC]**
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC16 Use of fuels

* **Environmental release categories [ERC]**
ERC2 Formulation into mixture
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)

* **Product Categories [PC]**
PC0 Other
PC13 Fuels

1.3 Details of the supplier of the safety data sheet

Supplier
GHC Gerling, Holz & Co. Handels GmbH
Ruhrstraße 113
D-22761 Hamburg
Telephone +49 40 853 123 0
E-mail hamburg@ghc.de
Website www.ghc.com

Department responsible for information:
GHC Gerling, Holz & Co. Handels GmbH
Telephone +49 40 853 123 0

E-mail (competent person):
msds@ghc.de

1.4 Emergency telephone number

EN: Poison Information Center Mainz +49 6131 19240

* SECTION 2: Hazards identification

* 2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]	Classification procedure
Flam. Gas 1A, H220	
Press. Gas (Liq.), H280	

Classification according to Regulation (EC) No 1272/2008 [CLP]	Classification procedure
Carc. 2, H351	
Repr. 1B, H360FD	
Aquatic Chronic 3, H412	

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.
H360FD May damage fertility. May damage the unborn child.

Hazard statements for environmental hazards
H412 Harmful to aquatic life with long lasting effects.

* **2.2 Label elements**

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

Hazard pictograms

GHS02

GHS08

Signal word
Danger

Hazard statements
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H351 Suspected of causing cancer.
H360FD May damage fertility. May damage the unborn child.
H412 Harmful to aquatic life with long lasting effects.

* **Precautionary statements**
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

Supplemental hazard information
EIGA0357 Asphyxiant in high concentrations.
EIGA0803 Restricted to professional users.
Please return container with residual pressure.

2.3 Other hazards

Adverse human health effects and symptoms
Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
Contact with liquid may cause cold burns/frostbite.

Other adverse effects
The substance/mixture does not contain components identified as having endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated Regulation (EU) 2017/2100 or Commission Delegated Regulation (EU) 2018/605 in quantities of 0.1% or more.

Results of PBT and vPvB assessment
The substance/mixture does not contain components meeting the PBT/vPvB criteria of the Reach Regulation, Annex XIII, at levels of 0.1% or higher.

* SECTION 3: Composition / information on ingredients

3.1 Substances

Substance name	chloroethane
Index No	602-009-00-0
EC No	200-830-5
REACH No.	01-2119487479-17
CAS No	75-00-3
ATE	ATE(inhalation gas): > 19000 ppm

* **Additional information**
Content: >= 99,8 %

* 3.2 Mixtures

not applicable

* SECTION 4: First aid measures

4.1 Description of first aid measures

General information
Remove contaminated, saturated clothing immediately.
Call a physician immediately.
First aider: Pay attention to self-protection!
Alcohol increases toxic effects.

Following inhalation
Remove casualty to fresh air and keep warm and at rest.
In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Obtain medical assistance.

Following skin contact
In case of skin contact rinse with warm water.
In case of frostbite, wash with plenty of water; do not remove clothing.
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.

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

Following ingestion
Ingestion is not considered a potential route of exposure.

* 4.2 Most important symptoms and effects, both acute and delayed

Symptoms
The following symptoms may occur in case of strong exposition:
Depression of central nervous system
Cardiopulmonary arrest.
Unconsciousness
Vomiting
Headache

* **Effects**
Long-term inhaling of separation products may cause pulmonary oedema.
Diminished responsiveness

* 4.3 Indication of any immediate medical attention and special treatment needed

* **Notes for the doctor**
Treat symptomatically.
To supervise the blood circulation.
Do not apply drugs of the adrenaline ephedrine group.

* SECTION 5: Firefighting measures

* 5.1 Extinguishing media

* **Suitable extinguishing media**
Extinguishing powder
Foam

* **Unsuitable extinguishing media**
Carbon dioxide (CO_2)
Full water jet

* 5.2 Special hazards arising from the substance or mixture

* **Hazardous combustion products**
In case of fire formation of dangerous gases possible.
Hydrogen chloride (HCl)
Phosgene
Carbon monoxide
Carbon dioxide (CO_2)

5.3 Advice for firefighters

Special protective equipment for firefighters
Wear a self-contained breathing apparatus and chemical protective clothing.

Additional information
If possible, shut off gas valves and move containers to a safe location.
Use water spray jet to protect personnel and to cool endangered containers.
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.
Dispose of fire residues and contaminated extinguishing water in accordance with local, official regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Use personal protection equipment.
Leave the danger area.
Keep people away and stay on the upwind side.

For emergency responders
Personal protection by wearing close-fitting protective clothing and breathing apparatus.
Pay attention to extension of gas especially at ground (heavier than air) and in direction of the wind.
Remove persons to safety.
Eliminate all ignition sources if safe to do so.

6.2 Environmental precautions

If possible, stop flow of product.
Do not allow to enter into soil/subsoil.
Do not allow to enter into surface water or drains.

6.3 Methods and material for containment and cleaning up

For containment
If necessary, secure leaky pressure receptacles using a salvage container.
Prevent the liquid from spreading over a wide area (set up barriers, cover sewage systems).
Limit expansion of the gas (water spray jet).

For cleaning up
Leave to vapourize.
Provide adequate ventilation.

6.4 Reference to other sections

Disposal: see section 13
Personal protection equipment: see section 8

* SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protective measures
Use only in well-ventilated areas.
Transfer and handle product only in closed systems.
Usual measures for fire prevention.
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.
Prevent cylinders from falling over.
Take precautionary measures against static discharges. Ground barrels and installations. Use only antistatically equipped (spark-free) tools.
Use explosion-proof machinery, apparatus, ventilation facilities, tools etc.
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.

Advices on general occupational hygiene
When using do not eat, drink, smoke, sniff.
Wash hands before breaks and after work.
Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels
All regulations and local requirements for the storage of containers have to be respected.
Keep container tightly closed and in a well-ventilated place.
Containers' temperature should not be increased above 50 °C.
Prevent cylinders from falling over.
Only use containers specifically approved for the substance/product.
Information on suitable materials for receptacles and valves see ISO 11114.

Materials to avoid
Do not store together with explosives.
Do not store together with flammable liquids.
Do not store together with flammable solids.
Do not store together with pyrophoric and self-heating substances.
Do not store together with oxidizing liquids or oxidizing solids.
Do not store together with toxic liquids or toxic solids.
Do not store together with infectious substances.
Do not store together with radioactive material.
Do not store together with food or feed.

* 7.3 Specific end use(s)

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

* SECTION 8: Exposure controls/personal protection

* 8.1 Control parameters

Occupational exposure limit values

CAS No	EC No	Substance name	occupational exposure limit value
75-00-3	200-830-5	Ethyl chloride	100 [ml/m³(ppm)] 268 [mg/m³] (IE)

DNEL worker

CAS No	Substance name	DNEL value	DNEL type	Remark
75-00-3	chloroethane	5.01 mg/kg bw/day	long-term dermal (systemic)	Assessment factor 525
75-00-3	chloroethane	37.7 mg/m³	long-term inhalative (systemic)	Assessment factor 75

DNEL Consumer

CAS No	Substance name	DNEL value	DNEL type	Remark
75-00-3	chloroethane	1.79 mg/kg bw/day	Long-term – oral, systemic effects	Assessment factor 1050
75-00-3	chloroethane	1.79 mg/kg bw/day	long-term dermal (systemic)	Assessment factor 1050
75-00-3	chloroethane	6.7 mg/m³	long-term inhalative (systemic)	Assessment factor 150

PNEC

CAS No	Substance name	PNEC Value	PNEC type	Remark
75-00-3	chloroethane	0.058 mg/L	aquatic, freshwater	Assessment factor 1000
75-00-3	chloroethane	0.58 mg/L	aquatic, intermittent release	Assessment factor 100
75-00-3	chloroethane	0.006 mg/L	aquatic, marine water	Assessment factor 10000
75-00-3	chloroethane	0.307 mg/kg dw	sediment, freshwater	
75-00-3	chloroethane	0.031 mg/kg dw	sediment, marine water	
75-00-3	chloroethane	140 mg/L	sewage treatment plant (STP)	Assessment factor 1
75-00-3	chloroethane	0.031 mg/kg dw	soil	

* **8.2 Exposure controls**

* **Appropriate engineering controls**

* **Technical measures to prevent exposure**
Transfer and handle only in enclosed systems.

* **Personal protection equipment**

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

* **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

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

* **Respiratory protection**
Keep self contained breathing apparatus readily available for emergency use.
Respiratory protection necessary at:
high concentrations
Respiratory protection complying with EN 137.
Suitable respiratory protection apparatus:
Short term: filter apparatus, filter AX
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.

Thermal hazards
Use cold-resistant protective equipment.

Environmental exposure controls

Remark
Prevent release to the environment.

* SECTION 9: Physical and chemical properties

* 9.1 Information on basic physical and chemical properties

Physical state
Gaseous / liquefied under pressure.

Colour
colourless

Odour
pungent, ethereal

Safety relevant basis data

	Value	Method	Source, Remark
Odour threshold:			not determined
Melting point/freezing point			not applicable
Boiling point or initial boiling point and boiling range	13.1 °C		
flammability			Extremely flammable gas (H220).
Lower and upper explosion limit	Upper explosion limit 14.8 Vol-%		
Lower and upper explosion limit	Lower explosion limit 3.6 Vol-%		
Flash point			not applicable
Auto-ignition temperature	510 °C		
Decomposition temperature			not determined
pH			not applicable
Viscosity			not applicable
Solubility(ies)	Water solubility 5.74 g/L (20°C)		
Partition coefficient n-octanol/water (log value)	1.43		
Vapour pressure	1343 hPa (20°C)		
Density and/or relative density			not applicable
Relative vapour density	2.31		air = 1
particle characteristics			not applicable

* 9.2 Other information

Information with regard to physical hazard classes

Gases under pressure

Safety characteristics

	Value	Method, Result	Source, Remark
Critical temperature	187.2 °C		

* **Other information**
Vapours are heavier than air.

* SECTION 10: Stability and reactivity

10.1 Reactivity

Formation of explosive gas mixtures in contact with air.

10.2 Chemical stability

The substance is chemically stable under recommended conditions of storage, use and temperature.

10.3 Possibility of hazardous reactions

Must not be mixed with air or oxygen.
Danger of fire and explosion with oxidants, alkali metals and earth alkali metals.

10.4 Conditions to avoid

Heat sources / heat - risk of bursting.
Ignition sources, open flames, glowing metal surfaces, etc.

10.5 Incompatible materials

Aluminium / Aluminium alloys.
Zinc
Water / moisture.
Light

* 10.6 Hazardous decomposition products

When handled and stored appropriately, no dangerous decomposition products are known.

* SECTION 11: Toxicological information

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

Acute toxicity

Animal data

	Effective dose	Method,Evaluation	Source, Remark
Acute oral toxicity			Study technically not feasible.
Acute dermal toxicity			Study technically not feasible.
Acute inhalation toxicity	CAS No75-00-3 chloroethane Acute inhalation toxicity (gas) LC50: > 19000 ppm Species Rat Exposure time 4 h	OECD 403	

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

* Skin corrosion/irritation

Other information
Study technically not feasible.

* Serious eye damage/irritation

Other information
Study technically not feasible.

* Sensitisation to the respiratory tract

* **Assessment/classification**
No data available

* Skin sensitisation

Other information
Study technically not feasible.

Germ cell mutagenicity

	Value	Method	Result / Evaluation	Remark
In vitro mutagenicity/genotoxicity	Gene mutation	OECD 476	questionable	
In vivo mutagenicity/genotoxicity	Inhalation Species Mouse	OECD 474	negative	

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

Carcinogenicity

Animal data

	Value	Method	Result / Evaluation	Remark
Carcinogenicity	inhalative 15000 ppm Species rat (male/female) Exposure duration 2 a	OECD 451	positive	

Assessment/classification
Suspected of causing cancer.

Reproductive toxicity

Animal data

	Value	Method	Result / Evaluation	Remark
Reproductive toxicity	inhalative NOAEC 7000 ppm Species Rat	OECD 443	positive	

Assessment/classification
May damage fertility. May damage the unborn child.

* STOT-single exposure

* STOT SE 1 and 2

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

STOT-repeated exposure

Animal data

	Effective dose	Method	Specific effects:	Organs affected:	Source, Remark
Inhalative specific target organ toxicity (repeated exposure)	NOAEL(C): 19000 ppm Species Mouse	OECD 413			

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

* Aspiration hazard

Assessment/classification
Study technically not feasible.

11.2 Information on other hazards

No data available

* SECTION 12: Ecological information

* 12.1 Toxicity

Aquatic toxicity

	Effective dose	Method,Evaluation	Source, Remark
Acute (short-term) fish toxicity	LC50: 322.74 mg/L Species freshwater fish Test duration 96 h	QSAR	
Chronic (long-term) fish toxicity	not determined		
Acute (short-term) toxicity to crustacea	EC50 58 mg/L Species Daphnia magna (Big water flea) Test duration 48 h	EU Method C.2	
Chronic (long-term) toxicity to aquatic invertebrate	not determined		
Acute (short-term) toxicity to algae and cyanobacteria	EC50 118 mg/L Species Scenedesmus subspicatus Test duration 72 h	EU Method C.3	
Chronic (long-term) toxicity to aquatic algae and cyanobacteria	not determined		
Toxicity to other aquatic plants/organisms	not determined		
Toxicity to microorganisms	EC10 > 140 mg/L Species Pseudomonas putida Test duration 17 h	DIN 38412 / part 8	cell reproduction

12.2 Persistence and degradability

	Value	Method	Source, Remark
Biodegradation	Degradation rate 0 % Test duration 28 d	OECD 301 D / EU C.4-E	

Assessment/classification
Not readily biodegradable (according to OECD criteria)

* 12.3 Bioaccumulative potential

Assessment/classification
Based on the n-octanol/water partition coefficient accumulation in organisms is not expected.

12.4 Mobility in soil

	Value	Distribution	Transport type	Method	Remark
Half-life time in fresh water	17.41 L/kg			KOC value	

12.5 Results of PBT and vPvB assessment

The substance/mixture does not contain components meeting the PBT/vPvB criteria of the Reach Regulation, Annex XIII, at levels of 0.1% or higher.

* 12.6 Endocrine disrupting properties

No data available

* 12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste codes/waste designations according to EWC/AVV

Waste code product	Waste name
160504 *	gases in pressure containers (including halons) containing hazardous substances

Appropriate disposal / Product
Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste.
Prevent release to the environment. No disposal via the sewage.

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

SECTION 14: Transport information

	Land transport (ADR/RID)	Sea transport (IMDG)	Air transport (ICAO-TI / IATA-DGR)
14.1 UN number or ID number	UN 1037	UN 1037	UN 1037
14.2 UN proper shipping name	ETHYL CHLORIDE	ETHYL CHLORIDE	Ethyl 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 Maritime transport in bulk according to IMO instruments

No carriage in bulk.

Land transport (ADR/RID)

UN number or ID number	UN 1037
UN proper shipping name	ETHYL CHLORIDE
Transport hazard class(es)	2.1
Hazard label(s)	2.1
Classification code	2F
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	0
Special provisions	662
Tunnel restriction code	B/D

Sea transport (IMDG)

UN number or ID number	UN 1037
UN proper shipping name	ETHYL CHLORIDE
Transport hazard class(es)	2.1
Packing group	-
Environmental hazards	No
Limited quantity (LQ)	0
Marine pollutant	No
EmS	F-D, S-U

Air transport (ICAO-TI / IATA-DGR)

UN number or ID number	UN 1037
UN proper shipping name	Ethyl chloride
Transport hazard class(es)	2.1

Packing group	-
Environmental hazards	No

* SECTION 15: Regulatory information

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

* **EU legislation**

Restrictions of occupation
Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.
Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC).

* **Other regulations (EU)**

* **To follow:**
Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Annex XVII No 28 - 30.
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.
18. Liquefied flammable gases, Category 1 or 2
National and local regulations concerning chemicals shall be observed.

* **Directive 2010/75/EU on industrial emissions [Industrial Emissions Directive] VOC**
VOC-value ≥ 99.8 %

15.2 Chemical Safety Assessment

National regulations

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

* SECTION 16: Other information

* **Abbreviations and acronyms**
Flam. Gas 1A: Flammable gas, Category 1A
Press. Gas (Comp.): Compressed gas (CG)
Press. Gas (Liq.): Liquefied gas (LG)
Carc. 2: Carcinogen, Category 2
Repr. 1B: Reproductive toxicant, Category 1B
Aquatic Chronic 3: Long-term (chronic) aquatic hazard, Category 3

Key literature references and sources for data
Information from our suppliers and data from the "GESTIS Substances Database" and the "Registered Substances" database of the European Chemicals Agency (ECHA) were used to create this safety data sheet.

Additional information
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.

Relevant H- and EUH-phrases (Number and full text)

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
H351	Suspected of causing cancer.
H360FD	May damage fertility. May damage the unborn child.
H412	Harmful to aquatic life with long lasting effects.

Indication of changes
* Data changed compared with the previous version

Exposure Szenarios

Table of Contents

1. ES 1: Formulation or re-packing

1.1. Title section

ES name: *Formulation of preparations (small container filling, mixing and repacking)*

Environment	
1: *Formulation of preparations (small container filling, mixing and repacking)*	ERC 2
Worker	
2: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition*	PROC 3
3: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing)*	PROC 9

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: *Formulation of preparations (small container filling, mixing and repacking)* (ERC 2)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 2.41 tonnes/day
Annual amount per site <= 241 tonnes/year
Emission days >= 200 days per year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
No application of sewage sludge to soil
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

1.2.2. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition* (PROC 3)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.2.3. Control of worker exposure: *Transfer of substance or mixture into small containers (dedicated filling line, including weighing)* (PROC 9)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: *Formulation of preparations (small container filling, mixing and repacking)* (ERC 2)

Release route	**Release rate**	**Release estimation method**
Water	0 kg/day	ERC
Air	0.603 kg/day	ERC
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.97E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	1.59E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	2.42E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	1.29E-5 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	2.58E-5 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	5.03E-5 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.96E-6 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

1.3.2. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	13.44 mg/m³ (TRA Workers 3.0)	0.357
Dermal, systemic, long term	6.9E-3 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.358

1.3.3. Worker exposure: *Transfer of substance or mixture into smallcontainers (dedicated filling line, including weighing)* (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	5.376 mg/m³ (TRA Workers 3.0)	0.143
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	0.014
Combined, systemic, long term		0.156

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

2. ES 2: Use at industrial sites; Manufacture of bulk, large scale chemicals (including petroleum products) (SU 8)

2.1. Title section

ES name: *Reactive processing aid*
Sector of use: Manufacture of bulk, large scale chemicals (including petroleum products) (SU 8)

Environment	
1: *Reactive processing aid*	ERC 6b
Worker	
2: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions*	PROC 1
3: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions*	PROC 2
4: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition*	PROC 3
5: *Chemical production where opportunity for exposure arises*	PROC 4

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: *Reactive processing aid* (ERC 6b)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 12.05 tonnes/day
Annual amount per site <= 241 tonnes/year
Emission days >= 200 days per year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
No application of sewage sludge to soil
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

2.2.2. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions* (PROC 1)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.3. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions* (PROC 2)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90%; For further specification, refer to section 8 of the SDS.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.4. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition* (PROC 3)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.2.5. Control of worker exposure: *Chemical production where opportunity for exposure arises* (PROC 4)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Local exhaust ventilation; Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: *Reactive processing aid* (ERC 6b)

Release route	Release rate	Release estimation method
Water	0 kg/day	ERC
Air	0.121 kg/day	ERC
Soil	0 kg/day	Estimated release factor

Protection target	Exposure estimate	RCR
Fresh water	2.97E-5 mg/L (EUSES 2.1.2)	< 0.01

Protection target	Exposure estimate	RCR
Sediment (freshwater)	1.59E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	2.42E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	1.29E-5 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	1.04E-6 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	6.24E-6 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	5.99E-7 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

2.3.2. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.019 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

2.3.3. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.704 mg/m³ (TRA Workers 3.0)	0.125
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.027
Combined, systemic, long term		0.152

2.3.4. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	13.44 mg/m³ (TRA Workers 3.0)	0.357
Dermal, systemic, long term	6.9E-3 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.358

2.3.5. Worker exposure: *Chemical production where opportunity for exposure arises* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	26.88 mg/m³ (TRA Workers 3.0)	0.713
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	0.014
Combined, systemic, long term		0.727

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

3. ES 3: Use at industrial sites; Fuels (PC 13); Various sectors (SU 9, SU 11)

3.1. Title section

ES name: *Use as intermediate (non-strictly controlled conditions)*
Product category: Fuels (PC 13)
Sector of use: Manufacture of fine chemicals (SU 9), Manufacture of rubber products (SU 11)

Environment	
1: *Use as intermediate (non-strictly controlled conditions)*	ERC 6a
Worker	
2: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions*	PROC 1
3: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions*	PROC 2
4: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition*	PROC 3
5: *Chemical production where opportunity for exposure arises*	PROC 4
6: *Use of fuels*	PROC 16

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: *Use as intermediate (non-strictly controlled conditions)* (ERC 6a)

Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 28.35 tonnes/day
Annual amount per site <= 567 tonnes/year
Conditions and measures related to biological sewage treatment plant
Provide onsite wastewater treatment.
Assumed domestic sewage treatment plant flow >= 2E3 m3/day
No application of sewage sludge to soil
Conditions and measures related to external treatment of waste (including article waste)
Dispose of waste product or used containers according to local regulations.
Other conditions affecting environmental exposure
Receiving surface water flow >= 1.8E4 m3/day

3.2.2. Control of worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions* (PROC 1)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure

Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.3. Control of worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions* (PROC 2)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.4. Control of worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition* (PROC 3)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.5. Control of worker exposure: *Chemical production where opportunity for exposure arises* (PROC 4)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection.; Inhalation - minimum efficiency of 90 %; For further specification, refer to section 8 of the SDS.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.2.6. Control of worker exposure: *Use of fuels* (PROC 16)

Product (article) characteristics
Covers concentrations up to 100 %
Amount used (or contained in articles), frequency and duration of use/exposure
Covers use up to 8 h/day
Technical and organisational conditions and measures

Provide a good standard of controlled ventilation (5 to 10 air changes per hour).
Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.; If skin contamination is expected to extend to other parts of the body, then these body parts should also be protected with impervious garments in a manner equivalent to those described for the hands.; For further specification, refer to section 8 of the SDS.
Use suitable eye protection.
Other conditions affecting workers exposure
Indoor use
Assumes process temperature up to 40 °C

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: *Use as intermediate (non-strictly controlled conditions)* (ERC 6a)

Release route	Release rate	Release estimation method
Water	0 kg/day	ERC
Air	14.17 kg/day	ERC
Soil	28.35 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	2.97E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	1.59E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	2.42E-6 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	1.29E-5 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	0 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	1.22E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	2.2E-4 mg/m³ (EUSES 2.1.2)	< 0.01
Man via environment - Oral	8.6E-6 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

3.3.2. Worker exposure: *Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions* (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.019 mg/m³ (TRA Workers 3.0)	< 0.01
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		< 0.01

3.3.3. Worker exposure: *Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions* (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	4.704 mg/m³ (TRA Workers 3.0)	0.125
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers 3.0)	0.027
Combined, systemic, long term		0.152

3.3.4. Worker exposure: *Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition* (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	9.408 mg/m³ (TRA Workers 3.0)	0.25
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers 3.0)	0.014
Combined, systemic, long term		0.263

3.3.5. Worker exposure: *Chemical production where opportunity for exposure arises* (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	8.064 mg/m³ (TRA Workers 3.0)	0.214
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers 3.0)	0.137
Combined, systemic, long term		0.351

3.3.6. Worker exposure: *Use of fuels* (PROC 16)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	20.16 mg/m³ (TRA Workers 3.0)	0.535
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers 3.0)	< 0.01
Combined, systemic, long term		0.542

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

4. ES 4: Widespread use by professional workers; Other (PC 0)

4.1. Title section

ES name: *Use as cooling agent in hospitals (doctor)*
Product category: Other (PC 0)

ES “Use as cooling agent in hospitals” describes the use of chloroethane as cooling agent / local cryoanaesthesia. In this ES chloroethane is used in cooling sprays for local anaesthesia inside a safety zone of operating rooms in hospitals (indoor environment) that are actively ventilated by laminar air flow systems. The product is used by medical personnel (e.g. doctors) for specific applications of local anaesthesia, e.g. for setting up the catheter.
The local anaestheic effect is due to the fact that chloroethane, sprayed onto the skin as a liquid, immediately evaporates, leading to a substantial extraction of heat so that very low temperatures may occur on the skin.

ConsExpo web 1.0.7:
Model used for dermal exposure estimation: Direct product contact – Instant application
Model used for inhalation exposure estimation: Exposure to vapour – Instantaneous release
Limit the air concentration to the VP of pure substance: yes
Weight fraction substance for dermal route = 1 %
Weight fraction substance for inhalation route = 100 %
Molecular weight = 65.5 g/mol

Environment	
1: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)	ERC 8a
Worker	
2: Spraying	PROC 0

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC 8a)

Conditions and measures related to biological sewage treatment plant
Municipal sewage treatment plant is assumed.
Other conditions affecting environmental exposure
Indoor use
No water contact during use.

4.2.2. Control of worker exposure: Spraying (PROC 0)

Product (article) characteristics
Covers concentrations up to 100 %
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers infrequent uses, up to 2 weeks per year
Covers use up to 4 events per day

Assumes product amount of 4.5 g/event in contact to skin
Inhalation exposure duration per event: <= 45 min
For each use event, covers use amounts up to 4.5 g/event
Information and behavioral advice for consumers
Adult/child assumed: Adult
Body weight: 68.8 kg (ConsExpo fact sheet adult)
Other conditions affecting consumers exposure
Covers skin contact area up to 5 cm^2
Covers use in room size of 18 m3
Ventilation rate >= 67 ach (air changes per hour)
Inhalation rate: 36 m3/day (ConsExpo default, using body weight and light exercise level)

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC 8a)

Release route	Release rate	Release estimation method
Water	0.074 kg/day	ERC
Air	0.074 kg/day	ERC
Soil	0 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	4.55E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	2.43E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	4.49E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	2.4E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	4.25E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	2.65E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	2.25E-5 mg/m^3 (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.47E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

4.3.2. Worker exposure: Spraying (PROC 0)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.62 mg/m^3 (ConsExpo)	0.093
Dermal, systemic, long term	0.65 mg/kg bw/day (ConsExpo)	0.363

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

5. ES 5: Consumer use; Other (PC 0)

5.1. Title section

ES name: *Use as cooling agent in hospitals (patient)*
Product category: Other (PC 0)

ES “Use as cooling agent in hospitals” describes the use of chloroethane as cooling agent / local cryoanaesthesia. In this ES chloroethane is used in cooling sprays for local anaesthesia inside a safety zone of operating rooms in hospitals (indoor environment) that are actively ventilated by laminar air flow systems. The product is used by medical personnel (e.g. doctors) for specific applications of local anaesthesia, e.g. for setting up the catheter.
The local anaestheic effect is due to the fact that chloroethane, sprayed onto the skin as a liquid, immediately evaporates, leading to a substantial extraction of heat so that very low temperatures may occur on the skin.

ConsExpo web 1.0.7:
Model used for dermal exposure estimation: Direct product contact – Instant application
Model used for inhalation exposure estimation: Exposure to vapour – Instantaneous release
Limit the air concentration to the VP of pure substance: yes
Weight fraction substance for dermal route = 1 %
Weight fraction substance for inhalation route = 100 %
Molecular weight = 65.5 g/mol

Environment	
1: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)	ERC 8a
Consumer	
2: Spraying	PC 0

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC 8a)

Other conditions affecting environmental exposure
Municipal sewage treatment plant is assumed.
Indoor use
No water contact during use.

5.2.2. Control of consumer exposure: Spraying (PC 0)

Product (article) characteristics
Covers concentrations up to 100 %
Oral exposure is considered to be not relevant.
Amount used (or contained in articles), frequency and duration of use/exposure
Covers infrequent uses, up to 2 weeks per year
Covers use up to 1 events per day

Assumes product amount of 4.5 g/event in contact to skin
Inhalation exposure duration per event: <= 45 min
For each use event, covers use amounts up to 4.5 g/event
Information and behavioral advice for consumers
Adult/child assumed: Adult
Body weight: 68.8 kg (ConsExpo fact sheet adult)
Other conditions affecting consumers exposure
Covers skin contact area up to 16 cm^2
Covers use in room size of 18 m3
Ventilation rate >= 67 ach (air changes per hour)
Inhalation rate: 13.3 m3/day (ConsExpo default, using body weight and rest exercise level)

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC 8a)

Release route	Release rate	Release estimation method
Water	0.074 kg/day	ERC
Air	0.074 kg/day	ERC
Soil	0 kg/day	ERC

Protection target	Exposure estimate	RCR
Fresh water	4.55E-4 mg/L (EUSES 2.1.2)	< 0.01
Sediment (freshwater)	2.43E-3 mg/kg dw (EUSES 2.1.2)	< 0.01
Marine water	4.49E-5 mg/L (EUSES 2.1.2)	< 0.01
Sediment (marine water)	2.4E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Sewage Treatment Plant	4.25E-3 mg/L (EUSES 2.1.2)	< 0.01
Agricultural soil	2.65E-4 mg/kg dw (EUSES 2.1.2)	< 0.01
Man via environment - Inhalation (systemic effects)	2.25E-5 mg/m^3 (EUSES 2.1.2)	< 0.01
Man via environment - Oral	1.47E-5 mg/kg bw/day (EUSES 2.1.2)	< 0.01
Man via environment - combined routes		< 0.01

5.3.2. Consumer exposure: Spraying (PC 0)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long term	0.16 mg/m^3 (ConsExpo)	0.024
Dermal, systemic, long term	0.65 mg/kg bw/day (ConsExpo)	0.363

5.4. Guidance to DU to evaluate whether he works inside the

boundaries set by the ES