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

1.1 Product identifier
Material Name
Methanol
Synonyms
Methyl alcohol, wood alcohol, methyl hydroxide
Chemical Family
Alcohols

Registration status
01-2119433307-44-0031 EC #: 200-659-6. CAS #: 67-56-1.
1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses
Industrial use: Manufacture of substance. Distribution of substance. Formulation & (re)packing of substances and mixtures. Use as a fuel. Use in cleaning agents. Use as laboratory reagent. Water treatment chemicals, wastewater. Professional use: Use as a fuel. Use in cleaning agents. Use as laboratory reagent. Use in oil and gas field drilling and production operations. Consumer use: Consumer use of cleaning agents and de-icers. Consumer use of fuels.
Uses advised against
None identified
1.3 Details of the supplier of the safety data sheet

Methanex Europe SA/NV I
Waterloo Office Park - Building P
Drève Richelle 161 - box 31
B-1410 Waterloo
Belgium
Phone: +(32) 2 352 06 70
E-mail: reach@methanex.com
Fax: +(32) 2 352 06 99

1.4 Emergency telephone number
+44 (0) 1235 239 670 (24h/7d)
Member State Official Advisory Body telephone numbers, where applicable
145 (Swiss local number).

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008 [CLP]
Flammable Liquids - Category 2
Acute Toxicity - Oral - Category 3
Acute Toxicity - Dermal - Category 3
Acute Toxicity - Inhalation - Vapor - Category 3
Specific Target Organ Toxicity - Single Exposure - Category 1 (optic nerve , central nervous system)
2.2 Label elements
Labeling according to Regulation (EC) No. 1272/2008 [CLP]
Hazard symbols

Signal word
Danger
Hazard statements
H225 Highly flammable liquid and vapor.
H301 Toxic if swallowed.
H311 Toxic in contact with skin.
H331 Toxic if inhaled.
H370 Causes damage to organs.
Precautionary statements
Prevention
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P235 Keep cool
P260 Do not breathe dust/fume/gas/mist/vapors/spray
P280 Wear protective gloves/protective clothing/eye protection/face protection
Response
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor
P308+P311 If exposed or concerned: Call a POISON CENTER or doctor/physician
P321 Specific treatment (see label)
Storage
P403+P233 Store in a well-ventilated place. Keep container tightly closed
Disposal
P501 Dispose of contents/container in accordance with local/regional/national/international regulations
2.3 Other hazards
If swallowed there is a risk of blindness.

SECTION 3: Composition / information on ingredients

3.1 SUBSTANCES

CAS EC No Registration No	Component Name Synonyms	1272/2008 (CLP)	Percent
67-56-1 200-659-6 --	Methanol	Annex VI, Table 3: Flam. Liq. 2 - H225 Acute Tox. (Oral) 3 - H301 Acute Tox. (Vapour) 3 - H331 Acute Tox. (Gas) 3 - H331 Acute Tox. (Dermal) 3 - H311 Acute Tox. (Dust/Mist) 3 - H331 STOT SE 1 - H370	100

Component Related Regulatory Information
Specific concentration limit (SCL): STOT SE 1; H370: C≥10%. STOT SE 2; H371: 3% ≤ C < 10%.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Administer oxygen if breathing is difficult. Immediately call a POISON CENTER or doctor.

Skin

IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Wash with plenty of water. Immediately call a POISON CENTER or doctor. Wash contaminated clothing before reuse.

Eyes

IF IN EYES: Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation develops and persists, get medical attention.

Ingestion

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Seek medical attention immediately.

4.2 Most Important Symptoms/Effects

Acute

Poison. May be fatal if swallowed. If swallowed there is a risk of blindness. Toxic if swallowed, in contact with skin or if inhaled. Ingestion causes nausea, weakness and central nervous system effects, headache, vomiting, dizziness, symptoms of drunkenness. Coma and death due to respiratory failure may follow severe exposures: Medical treatment necessary. A latent period of several hours may occur between exposure and the onset of symptoms.

Delayed

Causes damage to organs through prolonged or repeated exposure.

4.3 Indication of Immediate Medical Attention and Special Treatment

Treat symptomatically and supportively. The severity of symptoms depends upon the length and concentration of the exposure. If ingested, get immediate medical attention. Antidote: Fomepizole enhances elimination of metabolic formic acid. Antidote should be administered by qualified medical personnel.

Note to Physicians

Treat symptomatically. The severity of outcome following methanol ingestion may be more related to the time between ingestion and treatment, rather than the amount ingested. Therefore, there is a need for rapid treatment of any ingestion exposure. Call a POISON CENTER.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Carbon dioxide, regular dry powder, water spray, alcohol resistant foam, sand. Use water spray to cool fire fire-exposed containers. Water will not cool methanol below its flash point. Collect spillage.

Unsuitable Extinguishing Media

Do not use high-pressure water streams.

5.2 Special hazards arising from the substance or mixture

Highly flammable liquid and vapor. Mixtures >20% methanol with water: flammable. May form explosive mixture with air. Vapors are heavier than air and may travel along the ground to some distant source of ignition and flash back. Containers may rupture or explode if exposed to heat. Dangerous gases may accumulate in confined spaces. Toxic.

Combustion

Releases toxic gases, vapors. Carbon monoxide, carbon dioxide, formaldehyde.

5.3 Advice for firefighters

Methanol: Burns with invisible flame. Flame may not be visible in daylight. Cool containers with water spray until well after the fire is out.

Fire Fighting Measures

Do not allow run-off from fire-fighting to enter drains or water courses. Keep unnecessary people away, isolate hazard area and deny entry.

Protective Equipment and Precautions for Firefighters

Wear full protective firefighting gear including self-contained breathing apparatus (SCBA) for protection against possible exposure.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate personal protective equipment. Move container from fire area if it can be done without risk. Do not breathe gas/fume/vapor/spray. Avoid contact with eyes and skin.

6.2 Environmental precautions

Avoid release to the environment. Biodegradable at low concentrations. Soluble in water. When released, this product is expected to evaporate. Contact authorities in the event of pollution of soil and aquatic environment or discharge into drains. Dispose in accordance with all applicable federal, state/regional and local laws and regulations.

6.3 Methods and Materials for Containment and Cleaning Up

Wear suitable protective clothing and eye/face protection. Stop leak if this can be done without risk. Do not touch or walk through spilled material. Evacuate the area promptly and keep upwind of the spilled material. Ensure adequate ventilation. Avoid inhalation of mists or vapors. Avoid contact with eyes, skin and clothing. Remove all sources of ignition. Avoid friction, static electricity and sparks. Small spills: Absorb with sand or other non-combustible material. Use non-sparking tools and equipment. Collect spilled material in appropriate container for disposal. Clean contaminated surface thoroughly. Large spills: Contain the released material by diking the containment area with absorbent. A vapor suppressing foam may be used to reduce vapors. Collect spilled material in appropriate container for reuse or disposal.

6.4 Reference to other sections

Safe handling: see section 7. Personal protection equipment (PPE): see section 8. Disposal: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Use in a well ventilated area. Wear personal protective clothing and equipment, see Section 8. Eliminate all sources of ignition. No smoking. Do not enter confined spaces unless adequately ventilated. Clean up contamination/spills as soon as they occur. Decontaminate personnel, spill area and all tools and equipment. Use explosion-proof equipment. Use good industrial hygiene practices in handling this material. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and leaving work. Empty containers may contain residual amounts of this product; therefore, empty containers should be handled with care. Do not breathe vapor.

7.2 Conditions for safe storage, including any incompatibilities

Store in a well-ventilated place. Keep container tightly closed.

Keep cool.

Store locked up.

Keep/Store only in original container. Keep out of direct sunlight, and away from heat, water, and incompatible materials. Ground/Bond container and receiving equipment. Provide appropriate fire extinguishers and spill cleanup equipment in or near storage area. Store at room temperature. Store in a dry area. Store in fireproof room. Keep unauthorized personnel away.

Incompatible Materials

Lead, Aluminum, zinc, oxidizing agents, strong acids, strong bases, polyethylene, PVC (Polyvinyl chloride), nitrile

7.3 Specific end use(s)

Industrial use: Manufacture of substance. Distribution of substance. Formulation & (re)packing of substances and mixtures. Use as a fuel. Use in cleaning agents. Use as laboratory reagent. Water treatment chemicals, wastewater. Professional use: Use as a fuel. Use in cleaning agents. Use as laboratory reagent. Use in oil and gas field drilling and production operations. Consumer use: Consumer use of cleaning agents and de-icers. Consumer use of fuels.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Component Exposure Limits

Methanol	**67-56-1**
EU (IOELV):	200 ppm TWA ; 260 mg/m3 TWA
	Possibility of significant uptake through the skin
ACGIH:	200 ppm TWA
	250 ppm STEL
Austria	200 ppm TWA [TMW]; 260 mg/m3 TWA [TMW]
	800 ppm STEL [KZW] 4 X 15 min ; 1040 mg/m3 STEL [KZW] 4 X 15 min
	skin notation
Belgium	200 ppm TWA ; 266 mg/m3 TWA
	250 ppm STEL ; 333 mg/m3 STEL
	Skin
Bulgaria	200 ppm TWA ; 260 mg/m3 TWA
	Skin notation
Croatia	200 ppm TWA [GVI]; 260 mg/m3 TWA [GVI]
	Skin Notation
Cyprus	200 ppm TWA ; 260 mg/m3 TWA
	Skin-potential for cutaneous absorption
Czech Republic	250 mg/m3 TWA
	1000 mg/m3 Ceiling
	Potential for cutaneous absorption
Denmark	200 ppm TWA ; 260 mg/m3 TWA
	Potential for cutaneous absorption
Estonia	200 ppm TWA ; 250 mg/m3 TWA
	250 ppm STEL ; 350 mg/m3 STEL

	Skin notation
Finland	200 ppm TWA ; 270 mg/m3 TWA
	250 ppm STEL ; 330 mg/m3 STEL
	Potential for cutaneous absorption
France	200 ppm TWA [VME] (restrictive limit); 260 mg/m3 TWA [VME] (restrictive limit)
	1000 ppm STEL [VLCT]; 1300 mg/m3 STEL [VLCT]
	Risk of cutaneous absorption
Germany (TRGS)	100 ppm TWA AGW (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed) exposure factor 2 ; 130 mg/m3 TWA AGW (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed) exposure factor 2
	skin notation
Germany (DFG)	100 ppm TWA MAK ; 130 mg/m3 TWA MAK
	200 ppm Peak ; 260 mg/m3 Peak
	skin notation
Greece	200 ppm TWA ; 260 mg/m3 TWA
	250 ppm STEL ; 325 mg/m3 STEL
	skin - potential for cutaneous absorption
Hungary	260 mg/m3 TWA [AK]
	potential for cutaneous absorption
Ireland	200 ppm TWA ; 260 mg/m3 TWA
	600 ppm STEL (calculated); 780 mg/m3 STEL (calculated)
	Potential for cutaneous absorption
Italy	200 ppm TWA Media Ponderata nel Tempo ; 260 mg/m3 TWA Media Ponderata nel Tempo
	skin - potential for cutaneous absorption
	200 ppm TWA ; 262 mg/m3 TWA
	Skin - potential for cutaneous absorption
Latvia	200 ppm TWA ; 260 mg/m3 TWA

	skin - potential for cutaneous exposure
Lithuania	200 ppm TWA [IPRD]; 260 mg/m3 TWA [IPRD]
	Skin notation
Luxembourg	200 ppm TWA; 260 mg/m3 TWA
Malta	200 ppm TWA ; 260 mg/m3 TWA
	possibility of significant uptake through the skin
Netherlands	133 mg/m3 TWA
	skin notation
Poland	100 mg/m3 TWA [NDS]
	300 mg/m3 STEL [NDSCh]
Portugal	200 ppm TWA [VLE-MP] (indicative limit value); 260 mg/m3 TWA [VLE-MP] (indicative limit value)
	250 ppm STEL [VLE-CD]
	skin - potential for cutaneous exposure (indicative limit value)
Romania	200 ppm TWA ; 260 mg/m3 TWA
Slovak Republic	200 ppm TWA ; 260 mg/m3 TWA
	Potential for cutaneous absorption
Slovenia	200 ppm TWA ; 260 mg/m3 TWA
	800 ppm STEL ; 1040 mg/m3 STEL
Spain	200 ppm TWA [VLA-ED] (indicative limit value); 266 mg/m3 TWA [VLA-ED] (indicative limit value)
	skin - potential for cutaneous absorption
Sweden	200 ppm TLV ; 250 mg/m3 TLV
	250 ppm Indicative STEL ; 350 mg/m3 Indicative STEL
	Skin notation
Switzerland	200 ppm TWA [MAK]; 260 mg/m3 TWA [MAK]
	800 ppm STEL [KZW]; 1040 mg/m3 STEL [KZW]

	skin notation
United Kingdom	200 ppm TWA ; 266 mg/m3 TWA
	250 ppm STEL ; 333 mg/m3 STEL
	Potential for cutaneous absorption

Component Biological Exposure Limits

Methanol	**67-56-1**
ACGIH:	15 mg/l Medium: urine Time: end of shift Parameter: Methanol (background, nonspecific)
Croatia	7 mg/g Creatinine Medium: urine Time: at the end of the work shift Parameter: Methanol (calculated on the average Creatinine value of 1,2 g/L urine ;for all results that are expressed as Creatinine, Creatinine concentration less than 0.5 g/L and greater than 3.0 g/L should not be considered)
Czech Republic	15 mg/l Medium: urine Time: end of shift Parameter: Methanol (background, nonspecific)
France	15 mg/l Medium: urine Time: end of shift Parameter: Methanol (Background noise on non-exposed subjects ;Non-specific (observed after the exposure to other substances))
Germany (DFG)	15 mg/l BAT Medium: urine Time: for long-term exposures: at the end of the shift after several shifts Parameter: Methanol ; 15 mg/l BAT Medium: urine Time: end of exposure or end of shift Parameter: Methanol
Germany (DFG)	200 ppm Peak ; 260 mg/m3 Peak
Germany (TRGS)	30 mg/l Medium: urine Time: end of shift Parameter: Methanol ; 30 mg/l Medium: urine Time: for long-term exposures: at the end of the shift after several shifts Parameter: Methanol
Ireland	15 mg/L Medium: urine Time: end of shift Parameter: Methanol (background;non-specific)
Italy	15 mg/l Medium: urine Sampling Time: end of shift Parameter: Methanol (Background, nonspecific)
Romania	6 mg/l Medium: urine Time: end of shift Parameter: Methanol
Slovak Republic	30 mg/l Medium: urine Time: end of exposure or work shift Parameter: Methanol ; 30 mg/l Medium: urine Time: after all work shifts Parameter: Methanol (for long-term exposure)
Switzerland	30 mg/l Medium: urine Time: end of shift, and after several shifts (for long-term exposures) Parameter: Methanol

Derived No Effect Levels (DNELs)

DNEL long-term inhalative (systemic): 130 mg/m³. DNEL short-term inhalative (systemic): 130 mg/m³. DNEL long-term inhalative (local). 130 mg/m³. DNEL acute inhalative (local). 130 mg/m³. DNEL long-term dermal (systemic): 20 mg/kg bw/day. DNEL short-term dermal (systemic): 20 mg/kg bw/day.

Predicted No Effect Concentrations (PNECs)

PNEC aquatic, freshwater: 20.8 mg/L. PNEC aquatic, intermittent release, freshwater: 1540 mg/L. PNEC aquatic, marine water: 2,08 mg/L. PNEC sediment, freshwater: 77 mg/kg. PNEC sediment, marine water: 7.7 mg/kg. PNEC sewage treatment plant (STP): 100 mg/L. PNEC soil: 100 mg/kg.

8.2 Exposure Controls

Engineering controls

Provide adequate local exhaust ventilation to maintain worker exposure below exposure limits. Use explosion-proof electrical/ventilating/lighting equipment. Handle substance within a closed system. Ground/Bond container and receiving equipment. Maintain eye wash fountain and quick-drench shower in work area.

Eye/face protection

Use eye protection according to EN 166, designed to protect against liquid splashes.

Skin Protection

Wear appropriate chemical resistant clothing (EN ISO 6529).

Respiratory Protection

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode (EN 137). Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Glove Recommendations

Wear suitable gloves tested to EN374, butyl rubber.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	clear	**Physical State**	liquid
Odor	alcohol odor	**Color**	colorless
Odor Threshold	4.2 - 5960 ppm	**pH**	Not applicable
Melting Point	-97.8 °C	**Boiling Point**	64.7 °C
Boiling Point Range	Not available	**Freezing point**	-97.6 °C
Evaporation Rate	4.1 (butyl acetate = 1)	**Flammability (solid, gas)**	Not applicable
Autoignition Temperature	464 °C	**Flash Point**	11 °C
Lower Explosive Limit	5.5 %	**Decomposition temperature**	Not available
Upper Explosive Limit	36.5 %	**Vapor Pressure**	12.8 kPa (@ 20 °C)
Vapor Density (air=1)	1.1 (@ 20 °C)	**Specific Gravity (water=1)**	792 kg/m³
Water Solubility	Not available	**Partition coefficient: n-octanol/water**	-0.77 (log value)
Viscosity	0.8 cP (20 °C, dynamic)	**Kinematic viscosity**	Not available

Solubility (Other)	Not available	**Density**	0.791 - 0.793 at 20 °C
VOC	100 %	**Molecular Weight**	32.04 (g/mol)
Critical Temperature	239.4 °C	**Oxidising properties**	Not oxidising
Explosive properties	Vapors may form explosive mixtures with air		

Solvent Miscibility
Miscible
Miscible with water.

SECTION 10: Stability and reactivity

10.1 Reactivity
Containers may rupture or explode if exposed to heat.
10.2 Chemical stability
Stable under normal conditions of use. In use may form flammable/explosive vapor-air mixture. Product is hygroscopic.
10.3 Possibility of hazardous reactions
Will not polymerize.
10.4 Conditions to avoid
Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.
10.5 Incompatible materials
Lead, Aluminum, zinc, oxidizing agents, strong acids, strong bases, polyethylene, PVC (Polyvinyl chloride), nitrile
10.6 Hazardous decomposition products
Heat, carbon monoxide, carbon dioxide, flammable gases, formaldehyde

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute and Chronic Toxicity
Poison. May be fatal if swallowed. If swallowed there is a risk of blindness. Toxic if swallowed, in contact with skin or if inhaled.
Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and the following selected endpoints are published:
Methanol (67-56-1)
Oral LD50 Rat 5600 mg/kg
Dermal LD50 Rabbit 15800 mg/kg
Inhalation LC50 Rat 64000 ppm 4 h
Product Toxicity Data
Acute Toxicity Estimate

Dermal	300 mg/kg
Inhalation - Vapor	3 mg/L
Oral	100 mg/kg

Irritation/Corrosivity Data

May cause irritation to eyes, skin and respiratory tract.
Respiratory Sensitization
No data available.
Dermal Sensitization
No data available.
Germ Cell Mutagenicity
No data available.
Component Carcinogenicity
None of this product's components are listed by IARC or DFG.
Toxicity for reproduction
No data available.
Specific Target Organ Toxicity - Single Exposure
optic nerve, central nervous system
Specific Target Organ Toxicity - Repeated Exposure
No target organs identified.
Aspiration hazard
No data available.

SECTION 12: Ecological information

12.1 Toxicity
Avoid release to the environment.
Component Analysis - Aquatic Toxicity

Methanol	**67-56-1**
Fish:	LC50 96 h Pimephales promelas 28200 mg/L [flow-through]; LC50 96 h Pimephales promelas >100 mg/L [static]; LC50 96 h Oncorhynchus mykiss 19500 - 20700 mg/L [flow-through]; LC50 96 h Oncorhynchus mykiss 18 - 20 mL/L [static]; LC50 96 h Lepomis macrochirus 13500 - 17600 mg/L [flow-through]
Algae:	EC50 72 hr Selenastrum capricornutum 22000 mg/l
Invertebrate:	EC50 48 hr Daphnia >10000 mg/l

12.2 Persistence and degradability
Rapidly degradable.
12.3 Bioaccumulative potential
No indication of bioaccumulation potential.
12.4 Mobility in soil
mobile
Bioconcentration factor (BCF)
Bioconcentration factor (BCF): < 10
12.5 Results of PBT and vPvB assessment
No components of this material are listed.
12.6 Other adverse effects
No additional information.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste. Incineration is the preferred disposal method.

Waste codes/waste designations according to LoW: EWC-code: 07 01 04*.
Empty product containers may contain product residue. Recycle if possible.
Prevent entry into sewers, drains, ditches, underground or confined spaces and waterways.
Dispose in accordance with all applicable federal, state/regional and local laws and regulations.

SECTION 14: Transport information

		ADR	RID	ICAO	IATA	ADN	IMDG
14.1	UN Number	UN1230	UN1230	UN1230	UN1230	UN1230	UN1230
14.2	UN Proper Shipping Name	METHANOL	METHANOL	METHANOL	METHANOL	METHANOL	METHANOL
14.3	Transport Hazard Class(es)	3 Risks: 3, 6.1	3 Risks: 3, 6.1	3 Risks: 3, 6.1	3 Risks: 3, 6.1	3 Risks: 3, 6.1	3 Risks: 3, 6.1
14.4	Packing Group	II	II	II	II	II	II
14.5	Environmental Hazards	--	--	--	--	--	--
14.6	Special Precautions For User	--	--	--	--	--	--
14.7	Transport in Bulk According to Annex II of MARPOL and the IBC Code	--	--	--	--	--	--
14.8	Further information	ADR Tunnel Code Restrictions: D/E	--	--	--	--	--

International Bulk Chemical Code
This material contains one or more of the following chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Methanol	**67-56-1**
IBC Code:	Category Y

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
REACH Candidate List of Substances of Very High Concern (SVHC) for Authorization (Article 59(1)) - Reg. (EU) No. 1907/2006
No components of this material are listed.
EU - REACH (1907/2006) - Annex XVII Restrictions of Certain Dangerous Substances, Mixtures and Articles
REACH List of Substances Subject to Restriction (Annex XVII) - Reg. (EU) No. 1907/2006
This list includes substances subject to Restriction. Under REACH, these substances are subject to restrictions on manufacture, placing on the market and use of certain dangerous substances, mixtures and articles
Methanol (67-56-1)
Use restricted. See item 69
EU - Substances Depleting the Ozone layer (1005/2009)
No components of this material are listed.
EU - Persistent Organic Pollutants (850/2004)
No components of this material are listed.
EU - Export and Import Restrictions (689/2008) - Chemicals and Articles Subject to Export Ban
No components of this material are listed.
EU - Seveso III Directive (2012/18/EU) - Qualifying Quantities of Dangerous Substances

Methanol	**67-56-1**
Lower-Tier Requirements	500 tonne
Higher-Tier Requirements	5000 tonne

EU - Plant Protection Products (1107/2009/EC)
No components of this material are listed.
EU - Biocides (528/2012/EU)
No components of this material are listed.
EU – Water Framework Directive (2000/60/EC)
No components of this material are listed.
EU - Limitation of Emissions of Volatile Organic Compounds Due to the Use of Organic Solvents in Certain Activities and Installations (1999/13/EC)
No components of this material are listed.
EU - Detergent Regulation (648/2004/EC)

Methanol	**67-56-1**
Consumer Labeling Requirements	Listed at concentrations exceeding 5.0% by weight (substance pursuant to Directive 76/768/EEC Annex III Part 1)

Germany Regulations
Germany Water Classification - Product
hazard class 2 - obviously hazardous to water
Germany Water Classification - Component
Methanol (67-56-1)
Reg. no 145 , hazard class 2 - obviously hazardous to water
Denmark Regulations

Methanol	**67-56-1**
	Solvents

	Properties of concern with regard to the List of hazardous substances

Component Analysis - Inventory
Methanol (67-56-1)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW	VN (Draft)
Yes	Yes	Yes	Yes	Yes	Yes	Yes

15.2 Chemical Safety Assessment
For this substance a chemical safety assessment has been carried out.

SECTION 16: Other information

16.1 Indication of changes
2020-07-31 - Update to Section(s) 8.
Preparation Date
New SDS: 14 September 2016
Revision date
2020-07-31
16.2 Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit

Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada)

16.3 Key literature references and sources for data

Available upon request.

16.4 Methods Used for Classification of Mixture According to Regulation (EC) No 1272/2008

Available upon request.

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

H225 Highly flammable liquid and vapor
H301 Toxic if swallowed
H311 Toxic in contact with skin
H331 Toxic if inhaled
H370 Causes damage to organs

16.6 Training advice

Read the Safety Data Sheet before handling product.

16.7 Further Information

Disclaimer:

The information above is believed to be accurate and represents the best information currently available to us. Users should make their own investigations to determine the suitability of the information for their particular purposes. This document is intended as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Methanex Corporation and its subsidiaries make no representations or warranties, either express or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein or the product to which the information refers. Accordingly, Methanex Corp. will not be responsible for damages resulting from use of or reliance upon this information.

Short description of all exposure scenarios

Table: Short description of all exposure scenarios with their use descriptors

ES Number	Identified use	Product Category (PC)	Sector of use (SU)	Process category (PROC)	Article Category (AC)	Environmental release category (ERC/SpERC)
1	Manufacture of the substance	-	3, 8, 9	1, 2, 3, 4, 8a, 8b, 15	-	ERC 1, 4, 6a
2	Distribution of the substance	-	3, 8, 9	1, 2, 3, 4, 8a, 8b, 9	-	ERC 1, 2
3	Formulation and (re)packing of substance and mixtures	-	3, 10	1, 2, 3, 4, 8a, 8b, 9, 15	-	ERC 2
4	Use as a fuel in industrial settings	-	3	1, 2, 3, 8a, 8b, 16, 19	-	ERC 8b
5	Use as a fuel in professional settings	-	22	1, 2, 3, 8a, 8b, 16, 19		ERC 8b, 8e
6	Industrial use in cleaning agents	-	3	1, 2, 3, 4, 7, 8a, 8b, 10, 13	-	ERC 4
7	Professional use in cleaning agents	-	22	1, 2, 3, 4, 8a, 8b, 10, 11, 13	-	ERC 8a, 8d
8	Use as a laboratory reagent in industrial settings	-	3	10, 15	-	ERC 4
9	Use as a laboratory reagent in professional settings	-	22	10, 15	-	ERC 8a
10	Industrial use as wastewater treatment chemical	-	3	2	-	ERC 9b
11	Professional use in oilfield drilling and production operations	-		4, 5, 8a, 8b		ERC 9b
12	Consumer use of cleaning agents and de-icers (liquid products)	4, 35	21	-	-	ERC 8a, 8d
13	Consumer use of cleaning agents and de-icers (spray products)	4, 35	21	-	-	ERC 8a, 8d
14	Consumer use of fuels (e.g in model engines)	13	21	-	-	ERC 8b, 8e

APPENDIX: EXPOSURE SCENARIOS FOR METHANOL ACCORDING TO CHEMICAL SAFETY REPORT

1. ES 1: Manufacture of the substance

1. Title section

Free short title	**Manufacture of the substance**

Systematic title based on use descriptor	SU3, SU8, SU9 PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15 ERC1, ERC4, ERC6a
Processes, tasks, activities covered	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 1, 2, 3, and 4

Product (article) characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm²)		Relevant for PROC 1 and 3
	Palm of both hands (480 cm²)		Relevant for PROC 2 and 4
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		Relevant for PROC 1
	Yes		Effectiveness: 90% Relevant for PROC 2, 3 and 4
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA

Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	Relevant for PROC 2, 3 and 4
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 8a and 8b

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm^2)		Relevant for PROC 8b
	Both hands (960 cm^2)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90% Relevant for PROC 8a
	Yes		Effectiveness: 97% Relevant for PROC 8b
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control of workers exposure for PROC 15

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240cm²)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.4. Control environmental exposure (ERC1, ERC4 and ERC 6a)

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC 1

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,001817
Long-term exposure, systemic, inhalative	0,013351 mg/m³	130 mg/m³	0,000103	
Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,002125
Short-term exposure, systemic, inhalative	0,053403 mg/m³	130 mg/m³	0,000411	

Estimated exposure for workers – PROC 2

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,039389
Long-term exposure, systemic, inhalative	3,338 mg/m³	130 mg/m³	0,025675	
Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

Estimated exposure for workers – PROC 3

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,058206
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,051349	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,212254
Short-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	

Estimated exposure for workers – PROC 4

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,17127
Long-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	
Short-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,479365
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC 8a

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,393889
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0.137143	0,650635
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 8b

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,214167
Long-term exposure, systemic, inhalative	10,013 mg/m³	130 mg/m³	0,077024	

Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,29119
Short-term exposure, systemic, inhalative	20,026 mg/m³	130 mg/m³	0,154048	

Estimated exposure for workers – PROC 15

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,054778
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,051349	
Short-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,106127
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

3.2. Environmental Exposure

Estimated exposure for environment ERC1, ERC4, ERC6a

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0

Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

2. ES 2: Distribution of the substance

1. Title section

Free short title	**Distribution of the substance**

Systematic title based on use descriptor	ERC 1 and 2; PROC 1, 2, 3, 4, 8a, 8b and 9; SU 3, 8, and 9
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 1, 2, 3 and 4

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	100%
Vapor pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm^2)		Relevant for PROC 1 and 3
	Palm of both hands (480 cm^2)		Relevant for PROC 2 and 4
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		Relevant for PROC 1

	Yes		Effectiveness: 90% Relevant for PROC 2, 3 and 4
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	Relevant for PROC 2, 3 and 4
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 8a, 8b and 9

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm^2)		Relevant for PROC 8b and 9
	Both hands (960 cm^2)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90% Relevant for PROC 8a and 9
	Yes		Effectiveness: 97% Relevant for PROC 8b
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3. Control environmental exposure (ERC1, ERC2)

Product characteristics

Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC1

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,001817
Long-term exposure, systemic, inhalative	0,013351 mg/m³	130 mg/m³	0,000103	
Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,002125
Short-term exposure, systemic, inhalative	0,053403 mg/m³	130 mg/m³	0,000411	

Estimated exposure for workers – PROC2

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,039389
Long-term exposure, systemic, inhalative	3,338 mg/m³	130 mg/m³	0,025675	

Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

Estimated exposure for workers – PROC3

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,058206
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,051349	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,212254
Short-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	

Estimated exposure for workers – PROC4

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,17127
Long-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	
Short-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,479365
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC 8a

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,393889
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,650635

Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 8b

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,214167
Long-term exposure, systemic, inhalative	10,013 mg/m³	130 mg/m³	0,077024	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,29119
Short-term exposure, systemic, inhalative	20,026 mg/m³	130 mg/m³	0,154048	

Estimated exposure for workers – PROC 9

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,273968
Long-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	
Short-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,479365
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

3.2. Environmental Exposure

Estimated exposure for environment ERC1, ERC2

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required

Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

3. ES 3: Formulation and (re)packing of substance and mixtures

1. Title section

Free short title	**Formulation and (re)packing of substance and mixtures**

Systematic title based on use descriptor	ERC 2; PROC 1, 2, 3, 4, 8a, 8b, 9, and 15; SU 3, 10
Processes, tasks, activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance and associated laboratory activities
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 1, 2, 3, and 4

Product (article) characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			

Exposed body parts dermal	Palm of one hand (240 cm²)		Relevant for PROC 1 and 3
	Palm of both hands (480 cm²)		Relevant for PROC 2 and 4
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		Relevant for PROC 1
	Yes		Effectiveness: 90% Relevant for PROC 2, 3 and 4
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Protective gloves	Yes	Gloves APF 5 80 %	Relevant for PROC 2, 3 and 4

2.2 Control of workers exposure for PROC 8a, 8b and 9

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm²)		Relevant for PROC 8b and 9
	Both hands (960 cm²)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			

Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90% Relevant for PROC 8a and 9
	Yes		Effectiveness: 97% Relevant for PROC 8b
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control of workers exposure for PROC 15

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240cm²)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Protective gloves	Yes	Gloves APF 5 80 %	

2.4. Control environmental exposure (ERC2)

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%

Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC 1

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,001817
Long-term exposure, systemic, inhalative	0,013351 mg/m³	130 mg/m³	0,000103	
Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,002125
Short-term exposure, systemic, inhalative	0,053403 mg/m³	130 mg/m³	0,000411	

Estimated exposure for workers – PROC 2

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,039389
Long-term exposure, systemic, inhalative	3,338 mg/m³	130 mg/m³	0,025675	

Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

Estimated exposure for workers – PROC 3

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,058206
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,051349	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,212254
Short-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	

Estimated exposure for workers – PROC 4

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,17127
Long-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	
Short-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,479365
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC 8a

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,393889

Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,650635
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 8b

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,214167
Long-term exposure, systemic, inhalative	10,013 mg/m³	130 mg/m³	0,077024	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,29119
Short-term exposure, systemic, inhalative	20,026 mg/m³	130 mg/m³	0,154048	

Estimated exposure for workers – PROC 9

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,273968
Long-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	
Short-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,479365
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC 15

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**

Long-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,054778
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,051349	
Short-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,106127
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

3.2. Environmental Exposure

Estimated exposure for environment ERC2

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document “Guidance on information requirements and chemical safety assessment – Part E: Risk characterization”

4. ES 4: Use as a fuel in industrial settings

1. Title section

Free short title	**Use as a fuel in industrial settings**

Systematic title based on use descriptor	ERC 8b; PROC 1, 2, 3, 8a, 8b, 16 and 19; SU 22

Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 1, 2 and 3

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm^2)		Relevant for PROC 1 and 3
	Palm of both hands (480 cm^2)		Relevant for PROC 2
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		Relevant for PROC 1
	Yes		Effectiveness: 90% Relevant for PROC 2 and 3
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	Relevant for PROC 2 and 3
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 8a and 8b

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	Max. 5 %
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm²)		Relevant for PROC 8b
	Both hands (960 cm²)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90% Relevant for PROC 8a
	Yes		Effectiveness: 97% Relevant for PROC 8b
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control of workers exposure for PROC 16

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	100% long term 5-25% short term
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm²)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Outside		

Technical conditions and measures at process level (source) to prevent release			
Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2,4 Control of workers exposure for PROC 19

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	Max. 10%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	1-4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Both hands and forearms (1980 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
None.			
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Protective gloves	Yes	Gloves APF 5 80 %	

2.5 Control environmental exposure (ERC8b)

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%

Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC1

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,001817
Long-term exposure, systemic, inhalative	0,013351 mg/m³	130 mg/m³	0,000103	
Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,002125
Short-term exposure, systemic, inhalative	0,053403 mg/m³	130 mg/m³	0,000411	

Estimated exposure for workers – PROC2

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,039389
Long-term exposure, systemic, inhalative	3,338 mg/m³	130 mg/m³	0,025675	

Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

Estimated exposure for workers – PROC3

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,058206
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,051349	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,212254
Short-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	

Estimated exposure for workers – PROC 8a

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,393889
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,650635
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 8b

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,214167

Long-term exposure, systemic, inhalative	10,013 mg/m³	130 mg/m³	0,077024	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,29119
Short-term exposure, systemic, inhalative	20,026 mg/m³	130 mg/m³	0,154048	

Estimated exposure for workers – PROC 16

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,260175
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	0,041143 mg/kg bw/day	20 mg/kg bw/day	0,002057	0,618248
Short-term exposure, systemic, inhalative	80,105 mg/m³	130 mg/m³	0,61619	

Estimated exposure for workers – PROC 19

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	1,697 mg/kg bw/day	20 mg/kg bw/day	0,084857	0,238905
Long-term exposure, systemic, inhalative	20,026 mg/m³	130 mg/m³	0,154048	
Short-term exposure, systemic, dermal	1,697 mg/kg bw/day	20 mg/kg bw/day	0,084857	0,598349
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

3.2. Environmental Exposure

Estimated exposure for environment ERC8b

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required

Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

5. ES 5: Use as a fuel in professional settings

1. Title section

Free short title	**Use as a fuel in professional settings**

Systematic title based on use descriptor	ERC 8b, 8e; PROC 1, 2, 3, 8a, 8b, 16 and 19; SU 22
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 1, 2 and 3

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	Relevant for PROC 1, 2 and 3
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			

Exposed body parts dermal	Palm of one hand (240 cm²)		Relevant for PROC 1 and 3
	Palm of both hands (480 cm²)		Relevant for PROC 2
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		Relevant for PROC 1
	Yes		Effectiveness: 80% Relevant for PROC 2 and 3
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	Relevant for PROC 2 and 3
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 8a and 8b

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	Max.5%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm²)		Relevant for PROC 8b
	Both hands (960 cm²)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			

Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control of workers exposure for PROC 16

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Outside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.4 Control of workers exposure for PROC 19

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	Max. 10%

Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	1-4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Both hands and forearms (1980 cm²)		
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
None.			
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Protective gloves	Yes	Gloves APF 5 80 %	

2.5 Control environmental exposure (ERC8b, ERC 8e)

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC1

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,002741
Long-term exposure, systemic, inhalative	0,133508 mg/m³	130 mg/m³	0,001027	
Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,005822
Short-term exposure, systemic, inhalative	0,534032 mg/m³	130 mg/m³	0,004108	

Estimated exposure for workers – PROC2

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413
Long-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	
Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,424508
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC3

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,212254
Long-term exposure, systemic, inhalative	26,67 mg/m³	130 mg/m³	0,205397	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,828444

Short-term exposure, systemic, inhalative	106,806 mg/m³	130 mg/m³	0,821587	

Estimated exposure for workers – PROC8a

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,263603
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,520349
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 8b

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,13523
Long-term exposure, systemic, inhalative	16,688 mg/m³	130 mg/m³	0,128373	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,263603
Short-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	

Estimated exposure for workers – PROC 16

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,516921
Long-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	
Short-term exposure, systemic, dermal	0,041143 mg/kg bw/day	20 mg/kg bw/day	0,002057	0,864724
Short-term exposure, systemic, inhalative	112,147 mg/m³	130 mg/m³	0,862667	

Estimated exposure for workers – PROC 19

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	1,697 mg/kg bw/day	20 mg/kg bw/day	0,084857	0,392952
Long-term exposure, systemic, inhalative	40,052 mg/m³	130 mg/m³	0,308095	
Short-term exposure, systemic, dermal	1,697 mg/kg bw/day	20 mg/kg bw/day	0,084857	0,187556
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

3.2. Environmental Exposure

Estimated exposure for environment ERC8b, ERC8a

Release route	Release rate		Release estimation method
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	Exposure estimate	RCR
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document “Guidance on information requirements and chemical safety assessment – Part E: Risk characterization”

6. ES 6: Industrial use in cleaning agents

1. Title section

Free short title	**Industrial use in cleaning agents**

Systematic title based on use descriptor	ERC 4; PROC 1, 2, 3, 4, 7, 8a, 8b, 10 and 13; SU 3
Processes, tasks, activities covered	Covers the use as a component of cleaning products i12ncluding transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified and Stoffenmanager v3.5 (only PROC 7)

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 1, 2, 3 and 4

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	Relevant for PROC 1, 2 and 3
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm^2)		Relevant for PROC 1 and 3
	Palm of both hands (480 cm^2)		Relevant for PROC 2 and 4
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		Relevant for PROC 1
	Yes		Effectiveness: 90% Relevant for PROC 2,3 and 4
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	Relevant for PROC 2, 3 and 4
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 7

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	25 %
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	8	Hours/day	Value has no influence on the result
Frequency of exposure	4-5	Days/year	
Amounts used			
Not relevant in the Stoffenmanger			
Human factors not influenced by risk management			
Not relevant in the Stoffenmanger			
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Room volume	> 1000	m^3	
Work within one meter of the source	No		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Segregation	Worker is not within one meter of the source		
Immision controls	Work in a spray cabin without specific ventilation system		
Organisational measures to prevent /limit releases, dispersion and exposure			
Work area regularly cleaned	Yes		
Equipment regularly inspected and well cleaned	Yes		
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	Yes	90 %	

2.3 Control of workers exposure for PROC 8a and 8b

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use

Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm^2)		Relevant for PROC 8b
	Both hands (960 cm^2)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90% Relevant for PROC 8a
	Yes		Effectiveness: 97% Relevant for PROC 8b
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.4 Control of workers exposure for PROC 10

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	Max. 80%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	>4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Both hands (960 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			

None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.5 Control of workers exposure for PROC 13

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	>4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of Both hands (480 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.6 Control environmental exposure (ERC4)

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC1

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,001817
Long-term exposure, systemic, inhalative	0,013351 mg/m³	130 mg/m³	0,000103	
Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,002125
Short-term exposure, systemic, inhalative	0,053403 mg/m³	130 mg/m³	0,000411	

Estimated exposure for workers – PROC2

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,039389
Long-term exposure, systemic, inhalative	3,338 mg/m³	130 mg/m³	0,025675	
Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413

Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

Estimated exposure for workers – PROC3

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,058206
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,05349	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,212254
Short-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	

Estimated exposure for workers – PROC4

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,17127
Long-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	
Short-term exposure, systemic, dermal	1,371 mg/kg bw/day	20 mg/kg bw/day	0,068571	0,479365
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC7

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,107143	0,001817
Long-term exposure, systemic, inhalative	0,013351 mg/m³	130 mg/m³	0,000103	

Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,107143	0,002125
Short-term exposure, systemic, inhalative	0,053403 mg/m³	130 mg/m³	0,000411	

Estimated exposure for workers – PROC 8a

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,393889
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,650635
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 8b

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,214167
Long-term exposure, systemic, inhalative	10,013 mg/m³	130 mg/m³	0,77024	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,29119
Short-term exposure, systemic, inhalative	20,026 mg/m³	130 mg/m³	0,154048	

Estimated exposure for workers – PROC 10

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	4.389 mg/kg bw/day	20 mg/kg bw/day	0,219429	0,424825

Long-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	
Short-term exposure, systemic, dermal	4.389 mg/kg bw/day	20 mg/kg bw/day	0,219429	0,630222
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC 13

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,393889
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,650635
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

3.2. Environmental Exposure

Estimated exposure for environment ERC8b, ERC8a

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation

	in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

7. ES 7: Professional use in cleaning agents

1. Title section

Free short title	**Professional use in cleaning agents**

Systematic title based on use descriptor	ERC 8a and 8d; PROC 1, 2, 3, 4, 8a, 8b, 10, 11, 13; SU 22
Processes, tasks, activities covered	Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified and Stoffenmanagerv3.5/RISKOFDERMv2,1 (only PROC 11)

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 1, 2, 3 and 4

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	Relevant for PROC 1, 2 and 3
Frequency of exposure	≤ 240	Days/year	Relevant for PROC 4
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm²)		Relevant for PROC 1 and 3
	Palm of both hands (480 cm²)		Relevant for PROC 2 and 4
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		Relevant for PROC 1
	Yes		Effectiveness: 80% Relevant for PROC 2,3 and 4
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			

Protective gloves	Yes	Gloves APF 5 80 %	Relevant for PROC 2, 3 and 4
Respiratory protection required	Yes	90%	Relevant for PROC 4

2.2 Control of workers exposure for PROC 8a and 8b

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	Max. 5%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm^2)		Relevant for PROC 8b
	Both hands (960 cm^2)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control of workers exposure for PROC 10

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	Max. 5%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	

Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (960 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.4 Control of workers exposure for PROC 11

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	Max. 3%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure (per shift)	200	mins/day	Value taken from Riskofderm; not relevant in the Stoffenmanager
Frequency of exposure	4-5	Days/week	Value taken from Stoffenmanager
Amounts used			
Application rate of product	5	L/min	
Human factors not influenced by risk management			
Exposed body parts dermal	Both hands (820 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Room volume	100 - 1000	m^3	
Technical conditions and measures at process level (source) to prevent release			
Segregation	Worker is not within one meter of the source		
Conditions and measures to control dispersion from source towards the worker			

Spraying process	Level or downward		
Direction of airflow that comes from the source	Away from the worker		
Distance of worker from the source	More than one meter		
Organisational measures to prevent /limit releases, dispersion and exposure			
Work area regularly cleaned	No		
Equipment regularly inspected and well cleaned	No		
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	Yes	90 %	
Protective gloves	Yes	Gloves APF 5 80 %	

2.5 Control of workers exposure for PROC 13

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	>4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of Both hands (480 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 80%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	Yes	90%	

2.6 Control environmental exposure (ERC8a, 8d)

Product characteristics

Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC1

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,002741
Long-term exposure, systemic, inhalative	0,133508 mg/m³	130 mg/m³	0,001027	
Short-term exposure, systemic, dermal	0,034286 mg/kg bw/day	20 mg/kg bw/day	0,001714	0,005822
Short-term exposure, systemic, inhalative	0,534032 mg/m³	130 mg/m³	0,004108	

Estimated exposure for workers – PROC2

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413

Long-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	
Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,424508
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC3

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,212254
Long-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,828444
Short-term exposure, systemic, inhalative	106,6806 mg/m³	130 mg/m³	0,821587	

Estimated exposure for workers – PROC4

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,822857 mg/kg bw/day	20 mg/kg bw/day	0,041143	0,349238
Long-term exposure, systemic, inhalative	40,052 mg/m³	130 mg/m³	0,308095	
Short-term exposure, systemic, dermal	0,822857 mg/kg bw/day	20 mg/kg bw/day	0,041143	0,184921
Short-term exposure, systemic, inhalative	18,691 mg/m³	130 mg/m³	0,143778	

Estimated exposure for workers – PROC 8a

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,263603

Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,520349
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 8b

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,13523
Long-term exposure, systemic, inhalative	16,688 mg/m³	130 mg/m³	0,128373	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,263603
Short-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	

Estimated exposure for workers – PROC 10

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,27046
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,527206
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC 11

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,321429 mg/kg bw/day	20 mg/kg bw/day	0,016071	0,566379

Long-term exposure, systemic, inhalative	71,54 mg/m³	130 mg/m³	0,550308	
Short-term exposure, systemic, dermal	0,321429 mg/kg bw/day	20 mg/kg bw/day	0,016071	0,566379
Short-term exposure, systemic, inhalative	71,54 mg/m³	130 mg/m³	0,550308	

Estimated exposure for workers – PROC 13

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,650635
Long-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	
Short-term exposure, systemic, dermal	2,743 mg/kg bw/day	20 mg/kg bw/day	0,137143	0,239841
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

3.2. Environmental Exposure

Estimated exposure for environment ERC8a, ERC8d

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0

Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

8. ES 8: Use as a laboratory reagent in industrial settings

1. Title section

Free short title	**Use as a laboratory reagent in industrial settings**

Systematic title based on use descriptor	ERC 4, PROC 10 and 15, SU 3
Processes, tasks, activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 10

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	80%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Both hands (960 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			

Local exhaust ventilation required	Yes		Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 15

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	100 %
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (240cm²)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.5 Control environmental exposure (ERC4)

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC10

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	4,389 mg/kg bw/day	20 mg/kg bw/day	0,219429	0,424825
Long-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	
Short-term exposure, systemic, dermal	4,389 mg/kg bw/day	20 mg/kg bw/day	0,219429	0,630222
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC15

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,054778
Long-term exposure, systemic, inhalative	6,675 mg/m³	130 mg/m³	0,051349	
Short-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,106127
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

3.2. Environmental Exposure

Estimated exposure for environment ERC4

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

9. ES 9: Use as a laboratory reagent in professional settings

1. Title section

Free short title	**Use as a laboratory reagent in professional settings**

Systematic title based on use descriptor	ERC 8a, PROC 10 and 15, SU 22
Processes, tasks, activities covered	Use of the substance within laboratory settings, including material transfers and equipment cleaning
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 10

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	Max. 5 %
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	

Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Both hands (960 cm²)		
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 15

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	100 %
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240cm²)		
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 80% (value refers to the “professional” scenario)
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA

Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control environmental exposure ERC8a

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC10

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,27046
Long-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	
Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,527206
Short-term exposure, systemic, inhalative	66,754 mg/m³	130 mg/m³	0,513492	

Estimated exposure for workers – PROC15

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,106127
Long-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	
Short-term exposure, systemic, dermal	0,068571 mg/kg bw/day	20 mg/kg bw/day	0,003429	0,208825
Short-term exposure, systemic, inhalative	26,702 mg/m³	130 mg/m³	0,205397	

3.2. Environmental Exposure

Estimated exposure for environment ERC8a

Release route	Release rate		Release estimation method
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	Exposure estimate	RCR
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2.0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document “Guidance on information requirements and chemical safety assessment – Part E: Risk characterization”

10. ES 10: Industrial use as wastewater treatment chemical

1. Title section

Free short title	**Industrial use as wastewater treatment chemical**

Systematic title based on use descriptor	ERC 9b; PROC 2; SU 3
Processes, tasks, activities covered	-
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2.0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 2

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	100 %
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control environmental exposure ERC9b

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			

Daily amount per site	Not relevant in ECETOC TRA
Annual amount per site	Not relevant in ECETOC TRA

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC2

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,039389
Long-term exposure, systemic, inhalative	3,338 mg/m³	130 mg/m³	0,025675	
Short-term exposure, systemic, dermal	0,274286 mg/kg bw/day	20 mg/kg bw/day	0,013714	0,116413
Short-term exposure, systemic, inhalative	13,351 mg/m³	130 mg/m³	0,102698	

3.2. Environmental Exposure

Estimated exposure for environment ERC4

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment -		Not required

Oral		

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

11. ES 11: Professional use in oilfield drilling and production operations

1. Title section

Free short title	**Professional use in oilfield drilling and production operations**

Systematic title based on use descriptor	ERC 9b; PROC 4, 5, 8a, 8b; SU 22
Processes, tasks, activities covered	Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance.
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2,0) modified

2. Conditions of use affecting exposure

2.1 Control of workers exposure for PROC 4

Product (article) characteristics	
Physical state of the product	liquid
Concentration of substance in product	100 %
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	1-4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Effectiveness: 80%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			

Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.2 Control of workers exposure for PROC 5

Product characteristics (including package design affecting exposure)	
Physical state of the product	Liquid
Concentration of substance in product	Max.5%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of both hands (480 cm^2)		
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
			None
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.3 Control of workers exposure for PROC 8a and 8b

Product characteristics (including package design affecting exposure)	
Physicalstate of the product	Liquid
Concentration of substance in product	Max.5%
Vapour pressure	169.27 hPa

Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Amounts used			
Not relevant in ECETOC TRA			
Human factors not influenced by risk management			

Exposed body parts dermal	Palm of both hands (480 cm^2)		Relevant for PROC 8b
	Both hands (960 cm^2)		Relevant for PROC 8a
Other given operational conditions affecting workers exposure			
Domain	Professional		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
			None
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Protective gloves	Yes	Gloves APF 5 80 %	
Respiratory protection required	No		

2.5 Control environmental exposure ERC9b

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	100%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health – Worker exposure

Estimated exposure for workers – PROC4

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,822857 mg/kg bw/day	20 mg/kg bw/day	0,041143	0,102762
Long-term exposure, systemic, inhalative	8,01 mg/m³	130 mg/m³	0,061619	
Short-term exposure, systemic, dermal	0,822857 mg/kg bw/day	20 mg/kg bw/day	0,041143	0,451936
Short-term exposure, systemic, inhalative	53,403 mg/m³	130 mg/m³	0,410794	

Estimated exposure for workers – PROC5

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,13523
Long-term exposure, systemic, inhalative	16,688 mg/m³	130 mg/m³	0,128373	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,263603
Short-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	

Estimated exposure for workers – PROC8a

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined
Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,13523
Long-term exposure, systemic, inhalative	16,688 mg/m³	130 mg/m³	0,128373	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,263603
Short-term exposure, systemic, inhalative	33,377 mg/m³	130 mg/m³	0,256746	

Estimated exposure for workers – PROC8b

Exposure	Exposure estimate	DNEL	RCR per route	RCR combined

Long-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,083881
Long-term exposure, systemic, inhalative	10,013 mg/m³	130 mg/m³	0,077024	
Short-term exposure, systemic, dermal	0,137143 mg/kg bw/day	20 mg/kg bw/day	0,006857	0,160905
Short-term exposure, systemic, inhalative	20,026 mg/m³	130 mg/m³	0,154048	

3.2. Environmental Exposure

Estimated exposure for environment ERC9b

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document “Guidance on information requirements and chemical safety assessment – Part E: Risk characterization”

12. ES 12: Consumer use of cleaning agents (e.g. windshield cleaner) and de-icers (liquid products)

1. Title section

Free short title	**Consumer use of cleaning agents (e.g. windshield cleaner) and de-icers (liquid products)**

Systematic title based on use descriptor	ERC 8a and 8d; PC 4 and 35, SU 21
Processes, tasks, activities covered	Application of cleaning agents and de-icers as liquid non-spray products.
Exposure assessment methodology	Tool used: ConsExpo (v4.1) Default exposure scenario with modifications[1]: Cleaning and washing agents/All-purpose cleaners/Liquid cleaner/Application (Inhalation evaporation model: mode of release – evaporation; Dermal direct product contact: dermal loading – instant application)

2. Conditions of use affecting exposure

2.1 Control of consumers exposure

Product (article) characteristics			
Physical state of the product	liquid		
Concentration of substance in product	0.59% PC 4 1% PC 35		
Vapour pressure	169.27 hPa		
Mol weight matrix	18	g/mol	
Mass transfer rate	0,413	m/min	Approximation according to Thibodauxs´s metthod

Frequency and duration of use			
Frequency of exposure	104	1/year	
Duration of exposure	240	mins	
Duration of application	20	mins	
Amounts used			
Applied amount	100	g/event	Correspondign applied amount dermal is assumed to be 5 g/event
Human factors not influenced by risk management			
Exposed body parts dermal	1900	cm^2	Refers to both hands and forearms
Inhalation rate	34.7	m^3/day	Light exercise
Other given operational conditions affecting workers exposure			
Room volume	58	m^3	
Ventilation rate	0,5	1/hr	
Release area	5	m^2	
Conditions and measures related to information and behavioural advice to consumers			
			None
Conditions and measures related to personal protection and hygiene			
			None

2.2 Control environmental exposure ERC8a and 8d

Product characteristics

Physical state of the product	Liquid
Concentration of substance in product	Max. 2,5%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health –Consumer exposure

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	0,392243 mg/kg bw/day	4 mg/kg bw/day	0,098061	0,145143
Long-term exposure, systemic, inhalative	1,224 mg/m³	26 mg/m³	0,047082	
Short-term exposure, systemic, dermal	0,726744 mg/kg bw/day	4 mg/kg bw/day	0,181686	0,46418
Short-term exposure, systemic, inhalative	7,345 mg/m³	26 mg/m³	0,366	

3.2. Environmental Exposure

Estimated exposure for environment ERC 8a and 8d

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**

Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

13. ES 13: Consumer use of cleaning agents (e.g. windshield cleaner) and de-icers (spray products)

1. Title section

Free short title	**Consumer use of cleaning agents (e.g. windshield cleaner) and de-icers (spray products)**

Systematic title based on use descriptor	ERC 8a and 8d, PC 4 and 35, SU 21
Processes, tasks, activities covered	Application of cleaning agents and de-icers as liquid spray products
Exposure assessment methodology	Tool used: ConsExpo (v4.1) Default exposure scenario: Cleaning and washing agents/All-purpose cleaners/Spray cleaner/Application spraying and application cleaning

2. Conditions of use affecting exposure

2.1 Control of consumers exposure

Product characteristic (including package design affecting exposure)			
Physical state of the product	liquid		
Concentration of substance in product	0.59% PC 4 5% PC 35		
Vapour pressure	169.27 hPa		
Mol weight matrix	22	g/mol	Only relevant within the "Application cleaning" model
Mass transfer rate	0,413	m/min	Approximation according to Thibodauxs´s metthod; Only relevant within the "Application cleaning" model

Frequency and duration of use			
Frequency of exposure	365	1/year	
Duration of exposure	60	mins	
Duration of application	10	mins	
Spray duration	0,41	mins	Only relevant within the "Application spraying" model
Amounts used			
Applied amount	16.2	g/event	Corresponding applied amount dermal is assumed to be 0,16 g/event
Human factors not influenced by risk management			
Exposed body parts dermal; Application spraying	960	cm^2	Refers to both hands
Exposed body parts dermal; Application Cleaning	215	cm^2	Refers to palm of one hand
Inhalation rate	34.7	m^3/day	Light exercise
Other given operational conditions affecting workers exposure			
Room volume	15	m^3	
Room height	2,5	m	Only relevant within the "Application spraying" model
Ventilation rate	2,5	1/hr	
Release area	1,71	m^2	Only relevant within the "Application cleaning" model
Conditions and measures related to information and behavioural advice to consumers			
Spraying away from exposed person			
Conditions and measures related to personal protection and hygiene			
			None

2.2 Control environmental exposure ERC8a and 8d

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	Max. 5.0%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	

	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health –Consumer exposure

Exposure	**Exposure estimate[1]**	**DNEL**	**RCR per route[1]**	**RCR combined[1]**
Long-term exposure, systemic, dermal	0,001841 mg/kg bw/day	4 mg/kg bw/day	0,00046	0,000934
Long-term exposure, systemic, inhalative	0,012323 mg/m³	26 mg/m³	0,000474	
Long-term exposure, systemic, oral	-	-	-	
Short-term exposure, systemic, dermal	0,001841 mg/kg bw/day	4 mg/kg bw/day	0,00046	0,011835
Short-term exposure, systemic, inhalative	0,295756 mg/m³	26 mg/m³	0,011375	
Short-term exposure, systemic, oral	-	-	-	

[1] The exposure estimate, RCR per route and RCR combined refers to the total exposure value resulting from the two sub-scenarios „Application spraying“ and „Application cleaning“.

3.2. Environmental Exposure

Estimated exposure for environment ERC 8a and 8d

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment -		Not required

Inhalation		
Man via Environment - Oral		Not required

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

Scaling method	Exposure estimation tool used: ECETOC TRA v2,0
Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document "Guidance on information requirements and chemical safety assessment – Part E: Risk characterization"

14. ES 14: Use of fuels

1. Title section

Free short title	**Use of fuels**

Systematic title based on use descriptor	PC 13, SU 21
Processes, tasks, activities covered	Application of fuels in model engines
Exposure assessment methodology	Tool used: ConsExpo (v4.1) (Inhalation model: Exposure to vapour – evaporation; Dermal model: Direct dermal contact with product: instant application; Dermal uptake model: Fraction)

2. Conditions of use affecting exposure

2.1 Control of consumers exposure

Product characteristic (including package design affecting exposure)			
Physical state of the product	liquid		
Concentration of substance in product	3%		According to the "Household products database" of the U.S. Department of Health and Human Services
Vapour pressure of substance	169	hPa	
Mol weight matrix	100	g/mol	Estimated on the basis of available commercial products (ingredients: e.g. nitroethane, nitromethane, castor oil)
Mass transfer rate	0,413	m/min	Approximation according to Thibodaux's method
Release area	2	cm^2	

Frequency and duration of use			
Frequency of exposure	2	1/week	
Duration of exposure	10	mins	
Duration of application	10	mins	
Amounts used			
Applied amount (inhalative)	800	g/event	
Human factors not influenced by risk management			

Inhalation rate	34.7	m³/day	Light exercise
Other given operational conditions affecting workers exposure			
Room volume	20	m³	
Ventilation rate	0,5	1/hr	
Release area (inhalation)	2	cm²	
Conditions and measures related to information and behavioural advice to consumers			
Avoid skin contact. In case of skin contact wash exposed skin areas immediately. Keep container tightly closed.			
Conditions and measures related to personal protection and hygiene			
Use of suitable chemical resistant gloves.			

2.2 Control environmental exposure ERC8b and 8e

Product characteristics	
Physical state of the product	Liquid
Concentration of substance in product	Max. 80%
Vapour pressure	169.27 hPa
Supply the product in a packaging that does not require cleaning/disposal.	

Frequency and duration of use			
Duration of exposure			Not relevant in ECETOC TRA
Frequency of exposure			Not relevant in ECETOC TRA
Amounts used			
Daily amount per site	Not relevant in ECETOC TRA		
Annual amount per site	Not relevant in ECETOC TRA		

Technical and organisational conditions and measures	
	Not relevant in ECETOC TRA
Conditions and measures related to sewage treatment plant	
	Not relevant in ECETOC TRA
Conditions and measures related to treatment of waste (including article waste)	
	Dispose of residues from cleaning of containers or equipment as hazardous waste form incineration.

3. Exposure estimation and reference to its source

3.1. Human Health –Consumer exposure

Exposure	**Exposure estimate**	**DNEL**	**RCR per route**	**RCR combined**
Long-term exposure, systemic, dermal	1,319 mg/kg bw/day	4 mg/kg bw/day	0,32967	0,329775
Long-term exposure, systemic, inhalative	0,002716 mg/m³	26 mg/m³	0,000104	

Long-term exposure, systemic, oral	-	-	-	
Short-term exposure, systemic, dermal	2,907 mg/kg bw/day	4 mg/kg bw/day	0,726744	0,736978
Short-term exposure, systemic, inhalative	0,266072 mg/m³	26 mg/m³	0,010234	
Short-term exposure, systemic, oral	-	-	-	

3.2. Environmental Exposure

Estimated exposure for environment ERC 8b and 8e

Release route	**Release rate**		**Release estimation method**
	Value	Unit	
Water			Not required
Air			Not required
Soil			Not required

Protection target	**Exposure estimate**	**RCR**
Freshwater		Not required
Sediment (freshwater)		Not required
Marine water		Not required
Sediment (marine water)		Not required
Sewage treatment plant		Not required
Agricultural soil		Not required
Man via Environment - Inhalation		Not required
Man via Environment - Oral		Not required

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

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Scalable parameters	Exposure duration and maximum concentration. All other parameters have to be taken directly from the exposure scenario provided.
Boundaries of scaling	RCR combined is calculated following the recommendation in the ECHA guidance document “Guidance on information requirements and chemical safety assessment – Part E: Risk characterization”