



SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
Regulation (EC) No. 1907/2006 as amended by Commission Regulation (EU) 2020/878
and Regulation (EC) No. 1272/2008

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

1.1. Product identifier

Product Name	Methanol
REACH registration number	01-2119433307-44-0031
EC No (EU Index No)	200-659-6
CAS No	67-56-1
Synonyms	Methyl alcohol, wood alcohol, methyl hydroxide
Pure substance/mixture	Substance
Molecular weight	32.04
Other information	Chemical Family - Alcohols

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

Recommended use	Industrial use, Professional use, Consumer use: Solvent Fuels Raw material Cleaning agent Laboratory reagent Use in oil and gas field drilling and production operations Water treatment chemicals, wastewater Consumer use of cleaning agents and de-icers
Uses advised against	None known

1.3. Details of the supplier of the safety data sheet

Supplier

Methanex Europe SA/NV
Waterloo Office Park - Building C
Drève Richelle 161 - C
B-1410 Waterloo
Belgium
Phone: +(32) 2 352 06 70

For further information, please contact

E-mail address reach@methanex.com

1.4. Emergency telephone number

Emergency telephone Carechem 24 International: +44 (0) 1235 239 670 (24h/7d)

Emergency telephone - §45 - (EC)1272/2008

Europe 112

Belgium	Belgian Poison Centre: 070 245 245 (French and Dutch)
Croatia	Croatian Institute of Public Health, Division for Toxicology: +38514686910 (Monday-Friday, 8:00 - 15:00 local time)
France	ORFILA – Poison Control Centers : +33 (0)1 45 42 59 59 Carechem 24 International: +33 1 72 11 00 03
Germany	Carechem 24 International: +49 89 220 61012, 0800 000 7801 (toll-free, access from Germany only)
Greece	(0030) 2107793777 (24 hours per day, 7 days per week) Carechem 24 International: +30 21 1198 3182
Hungary	Health Toxicological Information Service in Hungary (ETTSZ): +36 80 20 11 99
Italy	National Toxicology Information Center: +39 0382/26261 Carechem 24 International: 800 699 792
Netherlands	Nationaal Vergiftigingen Informatie Centrum (NVIC): +31 (0)30 2748888 – Only for the purpose of informing medical personnel in cases of acute intoxications Carechem 24 International: +31 10 713 8195
Poland	Carechem 24 International: +48 22 307 3690
Portugal	Portuguese Poison Center (CIAV): 808 250 143 (24 hours/365 days) Carechem 24 International: +351 30880 4750
Romania	International Health Regulations and Toxicological Information Office: 021.318.36.06 (direct) (Monday to Friday, between 8:00 and 15:00, local time)
Spain	National Toxicology Information Centre (SIT): +34 (0)91 562 04 20 (24 hours/365 days) Carechem 24 International: +34 91 114 2520
Sweden	112 – ask for Poisons Information Carechem 24 International: +46 8 566 42573
Switzerland	145

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 - (H225)
Acute toxicity - Oral	Category 3 - (H301)
Acute toxicity - Dermal	Category 3 - (H311)
Acute toxicity - Inhalation (Vapours)	Category 3 - (H331)
Specific target organ toxicity — single exposure	Category 1 - (H370)

2.2. Label elements

Contains Methanol



Signal word

Danger

Hazard statements

H301 - Toxic if swallowed.

H311 - Toxic in contact with skin.

H331 - Toxic if inhaled.

H370 - Causes damage to organs.

H225 - Highly flammable liquid and vapour.

Precautionary Statements - EU (§28, 1272/2008)

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260 - Do not breathe dust/fume/gas/mist/vapours/spray.

P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor.

P321 - Specific treatment (see supplemental first aid instructions on this label).

P370 + P378 - In case of fire: Use dry chemical, CO₂, water spray or alcohol-resistant foam to extinguish.

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed.

Additional information

This product requires tactile warnings if supplied to the general public. This product requires child resistant fastenings if supplied to the general public.

2.3. Other hazards

Harmful to aquatic life. Risk of blindness after swallowing the product.

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

Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Weight-%	REACH registration number	EC No (EU Index No)	Classification according to Regulation (EC) No. 1272/2008 [CLP]	Specific concentration limit (SCL)	M-Factor	M-Factor (long-term)
Methanol 67-56-1	100	01-211943330 7-44-0031	200-659-6	Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 3 (H331) STOT SE 1 (H370) Flam. Liq. 2 (H225)	STOT SE 1 :: C>=10% STOT SE 2 :: 3%<=C<10%	-	-

Full text of H- and EUH-phrases: see section 16

Acute Toxicity Estimate

If LD50/LC50 data is not available or does not correspond to the classification category, then the appropriate conversion value from CLP Annex I, Table 3.1.2, is used to calculate the acute toxicity estimate (ATE_{mix}) for classifying a mixture based on its components

Chemical name	Oral LD50 mg/kg	Dermal LD50 mg/kg	Inhalation LC50 - 4 hour - dust/mist - mg/L	Inhalation LC50 - 4 hour - vapour - mg/L	Inhalation LC50 - 4 hour - gas - ppm
Methanol 67-56-1	100	300	No data available	3	No data available

This product does not contain candidate substances of very high concern at a concentration >=0.1% (Regulation (EC) No. 1907/2006 (REACH), Article 59)

SECTION 4: First aid measures**4.1. Description of first aid measures**

General advice	Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.
Inhalation	Remove to fresh air. IF exposed or concerned: Get medical advice/attention. If breathing is irregular or stopped, administer artificial respiration. Immediate medical attention is required. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Get immediate medical attention.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Remove/Take off immediately all contaminated clothing. Get immediate medical attention.
Ingestion	Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Get immediate medical attention.
Self-protection of the first aider	Remove all sources of ignition. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Use personal protective equipment as required. See section 8 for more information. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Do not breathe vapour or mist.

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

Symptoms	Exposure may cause 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. May cause blindness.
Effects of Exposure	Causes damage to organs: Eyes.

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

Note to doctors	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. Antidote: Fomepizole enhances elimination of metabolic formic acid. Antidote should be administered by qualified medical personnel.
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SECTION 5: Firefighting measures**5.1. Extinguishing media**

Suitable Extinguishing Media	Use water spray to cool fire-exposed containers. Water will not cool methanol below its flash point. Dry chemical. Carbon dioxide (CO ₂). Water spray. Alcohol resistant foam. Dry sand.
Unsuitable extinguishing media	Do not use straight streams. Do not scatter spilled material with high pressure water streams.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical Mixtures >20% methanol with water: flammable. Highly flammable liquid and vapour. Risk of ignition. Keep product and empty container away from heat and sources of ignition. Vapours are heavier than air and may spread along floors. In the event of fire, cool tanks with water spray. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Hazardous combustion products Toxic gases or vapours. Carbon monoxide. Carbon dioxide (CO₂). Formaldehyde.

5.3. Advice for firefighters

Special protective equipment and precautions for fire-fighters Methanol: Burns with invisible flame. Flame may not be visible in daylight. Cool containers with flooding quantities of water until well after fire is out. Fires need to be assessed to determine appropriate protocols and safety measures for firefighting, including establishing safe zones, extinguishing media to be used, firefighter protection, and actions to control or extinguish the fire. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Personal precautions Evacuate personnel to safe areas. Use personal protective equipment as required. See section 8 for more information. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Pay attention to flashback. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Do not breathe vapour or mist.

Other information Ventilate the area. Refer to protective measures listed in Sections 7 and 8.

For emergency responders Use personal protection recommended in Section 8.

6.2. Environmental precautions

Environmental precautions Avoid release to the environment. Dispose of contents/containers in accordance with local regulations. 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. Refer to protective measures listed in Sections 7 and 8. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains.

6.3. Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. Do not touch or walk through spilled material. A vapour suppressing foam may be used to reduce vapours. Dyke far ahead of spill to collect run-off water. Keep out of drains, sewers, ditches and waterways. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.

Methods for cleaning up Take precautionary measures against static discharges. Dyke far ahead of liquid spill for later disposal. Soak up with inert absorbent material. Pick up and transfer to properly labelled containers. Small spill: Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use non-sparking tools. Collect spillage. Place in appropriate chemical waste container. Clean contaminated surface thoroughly. Large spill: Dyke far ahead of spill; use dry sand to contain the flow of material. Use clean non-sparking tools to collect absorbed material.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

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

Advice on safe handling Use according to package label instructions. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use grounding and bonding connection when transferring this material to prevent static discharge, fire or explosion. Use spark-proof tools and explosion-proof equipment. Keep in an area equipped with sprinklers. Do not eat, drink or smoke when using this product. Handle product only in closed system or provide appropriate exhaust ventilation. Use personal protection equipment. Avoid contact with skin, eyes or clothing. Take off contaminated clothing and wash it before reuse. Do not breathe vapour or mist. In case of insufficient ventilation, wear suitable respiratory equipment. Do not enter confined area unless adequately ventilated.

General hygiene considerations Handle in accordance with good industrial hygiene and safety practice. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Do not breathe vapour or mist. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep in properly labelled containers. Do not store near combustible materials. Keep in an area equipped with sprinklers. Store in accordance with local regulations. Keep unauthorised personnel away. Store locked up.

Storage class (TRGS 510) LGK 3.

7.3. Specific end use(s)

Specific use(s) Manufacture of substance. Formulation & (re)packing of substances and mixtures Distribution of formulations. Use as an intermediate. Use as a Process chemical Distribution of substance. Use as a Fuel (use in industrial settings). Use in Cleaning Agents (use in industrial settings). Use as laboratory reagent/agent (use in industrial settings). Use as wastewater treatment chemical (use in industrial settings). Use in Oilfield drilling and production operations (use in industrial settings). Use as a Fuel (use in professional settings). Use in Cleaning Agents (use in professional settings). Use as laboratory reagent/agent (use in professional settings). Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (spray products). Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (liquid products). Use as Fuel additive (consumer use) (outdoor use).

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure Limits

Chemical name	European Union	Austria	Belgium	Bulgaria	Croatia
Methanol 67-56-1	TWA: 200 ppm TWA: 260 mg/m ³ *	TWA: 200 ppm TWA: 260 mg/m ³ STEL 800 ppm STEL 1040 mg/m ³ H*	TWA: 200 ppm TWA: 266 mg/m ³ STEL: 250 ppm STEL: 333 mg/m ³ D*	TWA: 200 ppm TWA: 260.0 mg/m ³ K*	TWA: 200 ppm TWA: 260 mg/m ³ *
Chemical name	Cyprus	Czech Republic	Denmark	Estonia	Finland
Methanol 67-56-1	* TWA: 200 ppm TWA: 260 mg/m ³	TWA: 250 mg/m ³ Ceiling: 1000 mg/m ³ D*	TWA: 200 ppm TWA: 260 mg/m ³ H* STEL: 400 ppm STEL: 520 mg/m ³	TWA: 200 ppm TWA: 250 mg/m ³ STEL: 250 ppm STEL: 350 mg/m ³ A*	TWA: 200 ppm TWA: 270 mg/m ³ STEL: 250 ppm STEL: 330 mg/m ³ iho*
Chemical name	France	Germany TRGS	Germany DFG	Greece	Hungary
Methanol 67-56-1	TWA: 200 ppm TWA: 260 mg/m ³ STEL: 1000 ppm STEL: 1300 mg/m ³ *	TWA: 100 ppm TWA: 130 mg/m ³ H*	TWA: 100 ppm TWA: 130 mg/m ³ Peak: 200 ppm Peak: 260 mg/m ³ *	TWA: 200 ppm TWA: 260 mg/m ³ STEL: 250 ppm STEL: 325 mg/m ³ *	TWA: 260 mg/m ³ TWA: 200 ppm b*
Chemical name	Ireland	Italy MDLPS	Italy AIDII	Latvia	Lithuania
Methanol 67-56-1	TWA: 200 ppm TWA: 260 mg/m ³ STEL: 600 ppm STEL: 780 mg/m ³ Sk*	TWA: 200 ppm TWA: 260 mg/m ³ cute*	TWA: 200 ppm TWA: 262 mg/m ³ STEL: 250 ppm STEL: 328 mg/m ³ cute*	TWA: 200 ppm TWA: 260 mg/m ³ Ada*	O* TWA: 200 ppm TWA: 260 mg/m ³
Chemical name	Luxembourg	Malta	Netherlands	Norway	Poland
Methanol 67-56-1	Peau* TWA: 200 ppm TWA: 260 mg/m ³	skin* TWA: 200 ppm TWA: 260 mg/m ³	TWA: 100 ppm TWA: 133 mg/m ³ H*	TWA: 100 ppm TWA: 130 mg/m ³ STEL: 150 ppm STEL: 162.5 mg/m ³ H*	STEL: 300 mg/m ³ TWA: 100 mg/m ³ Prohibited - substances or mixtures containing Methanol in weight concentration >3%;except fuels used in the model building, powerboating, fuel cells and biofuels skóra*
Chemical name	Portugal	Romania	Slovakia	Slovenia	Spain
Methanol 67-56-1	TWA: 200 ppm TWA: 260 mg/m ³ STEL: 250 ppm Cutânea*	TWA: 200 ppm TWA: 260 mg/m ³ P*	TWA: 200 ppm TWA: 260 mg/m ³ K*	TWA: 200 ppm TWA: 260 mg/m ³ STEL: 800 ppm STEL: 1040 mg/m ³ K*	TWA: 200 ppm TWA: 266 mg/m ³ vía dérmica*
Chemical name	Sweden		Switzerland		United Kingdom
Methanol 67-56-1	NGV: 200 ppm NGV: 250 mg/m ³ Vägledande KGV: 250 ppm Vägledande KGV: 350 mg/m ³ H*		TWA: 200 ppm TWA: 260 mg/m ³ STEL: 400 ppm STEL: 520 mg/m ³ H*		TWA: 200 ppm TWA: 266 mg/m ³ STEL: 250 ppm STEL: 333 mg/m ³ Sk*

Other information on limit values OEL values in accordance with Commission Directive 2000/39/EC of 8 June 2003, as amended, establishing a first list of indicative occupational exposure limit values in the implementation of Council Directive 98/24/EC

Biological occupational exposure limits

Chemical name	European Union	Austria	Bulgaria	Croatia	Czech Republic
Methanol	-	-	-	7.0 mg/g Creatinine	0.47 mmol/L (urine -

67-56-1				- urine (Methanol) - at the end of the work shift	Methanol end of shift) 15 mg/L (urine - Methanol end of shift)
Chemical name	Denmark	Finland	France	Germany DFG	Germany TRGS
Methanol 67-56-1	-	-	- urine (Methanol) - end of shift	15 mg/L (urine - Methanol end of shift) 15 mg/L (urine - Methanol for long-term exposures: at the end of the shift after several shifts) 15 mg/L - BAT (for long-term exposures: at the end of the shift after several shifts) urine 15 mg/L - BAT (end of exposure or end of shift) urine	15 mg/L (urine - Methanol end of shift) 15 mg/L (urine - Methanol for long-term exposures: at the end of the shift after several shifts)
Chemical name	Hungary	Ireland	Italy MDLPS	Italy AIDII	
Methanol 67-56-1	30 mg/L (urine - Methanol end of shift) 940 µmol/L (urine - Methanol end of shift)	15 mg/L (urine - Methanol end of shift)	-	15 mg/L - urine (Methanol) - end of shift	
Chemical name	Latvia	Luxembourg	Romania	Slovakia	
Methanol 67-56-1	-	-	6 mg/L - urine (Methanol) - end of shift	30 mg/L (urine - Methanol end of exposure or work shift) 30 mg/L (urine - Methanol after all work shifts)	
Chemical name	Slovenia	Spain	Switzerland	United Kingdom	
Methanol 67-56-1	15 mg/L - urine (Methanol) - at the end of the work shift; for long-term exposure: at the end of the work shift after several consecutive workdays	15 mg/L (urine - Methanol end of shift)	30 mg/L (urine - Methanol end of shift, and after several shifts (for long-term exposures)) 936 µmol/L (urine - Methanol end of shift, and after several shifts (for long-term exposures))	-	

Derived No Effect Level (DNEL) - Workers

Chemical name	Oral	Dermal	Inhalation
Methanol 67-56-1	-	20 mg/kg bw/day [4] [6] 20 mg/kg bw/day [4] [7]	130 mg/m ³ [4] [6] 130 mg/m ³ [4] [7] 130 mg/m ³ [5] [6] 130 mg/m ³ [5] [7]

Notes

- [4] Systemic health effects.
 [5] Local health effects.
 [6] Long term.
 [7] Short term.

Derived No Effect Level (DNEL) - General Public

Chemical name	Oral	Dermal	Inhalation
Methanol 67-56-1	4 mg/kg bw/day [4] [6] 4 mg/kg bw/day [4] [7]	4 mg/kg bw/day [4] [6] 4 mg/kg bw/day [4] [7]	26 mg/m ³ [4] [6] 26 mg/m ³ [4] [7] 26 mg/m ³ [5] [6] 26 mg/m ³ [5] [7]

Notes

[4]	Systemic health effects.
[5]	Local health effects.
[6]	Long term.
[7]	Short term.

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Chemical name	Freshwater	Freshwater (intermittent release)	Marine water	Marine water (intermittent release)	Air
Methanol 67-56-1	20.8 mg/L	1540 mg/L	2.08 mg/L	-	-

Chemical name	Freshwater sediment	Marine sediment	Sewage treatment	Soil	Food chain
Methanol 67-56-1	77 mg/kg sediment dw	7.7 mg/kg sediment dw	100 mg/L	100 mg/kg soil dw	-

8.2. Exposure controls**Engineering controls**

Provide local exhaust ventilation. Handle product only in closed system or provide appropriate exhaust ventilation. Use explosion-proof ventilating equipment. All equipment used when handling the product must be grounded. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment**Eye/face protection**

Tight sealing safety goggles. Eye protection must conform to standard EN 166.

Hand protection

Wear suitable gloves. Impervious gloves. Butyl rubber. Gloves must conform to standard EN 374.

Skin and body protection

Wear suitable protective 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. Use a properly fitted, air-purifying or supplied air respirator complying with an approved standard if a risk assessment indicates this is necessary. 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 (EN 137).

General advice

PPE assigned in accordance with Council Directive 89/656/EEC of 30 November 1989, as amended, concerning the minimum safety and health requirements for the use by workers of personal protective equipment at the workplace.

General hygiene considerations

Handle in accordance with good industrial hygiene and safety practice. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work

area and clothing is recommended. Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Do not breathe vapour or mist. Do not eat, drink or smoke when using this product.

Environmental exposure controls Avoid release to the environment. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Clear liquid
Physical state	Liquid
Colour	Clear
Odour	Alcohol
Odour threshold	4.2 - 5960 ppm

Property	Values	Remarks • Method
Melting point / freezing point	-97.8 °C	No data available
Initial boiling point and boiling range	64.7 °C	No data available
Flammability		No data available
Flammability Limit in Air		
Upper flammability or explosive limits	36.5%	No data available
Lower flammability or explosive limits	5.5%	No data available
Flash point	11 °C	No data available
Autoignition temperature	464 °C	No data available
Decomposition temperature		No data available
pH		No data available
pH (as aqueous solution)		No data available
Kinematic viscosity		No data available
Dynamic viscosity	0.8 cP	@ 20 °C
Water solubility	Miscible in water	No data available
Solubility(ies)		No data available
Partition coefficient	-0.77	log Pow
Vapour pressure	12.8 kPa	@ 20 °C
Relative density	0.791 - 0.793	@20°C
Bulk density		No data available
Liquid Density		No data available
Relative vapour density	1.1	@ 20 °C (air = 1)
Particle characteristics		
Particle Size		No data available
Particle Size Distribution		No data available

9.2. Other information

Molecular weight	32.04
VOC content	100%

9.2.1. Information with regards to physical hazard classes

Explosive properties Vapours may form explosive mixtures with air

9.2.2. Other safety characteristics

Evaporation rate 4.1 Butyl acetate = 1

SECTION 10: Stability and reactivity**10.1. Reactivity**

Reactivity Containers may rupture or explode if exposed to heat.

10.2. Chemical stability

Stability Stable under normal conditions. May form flammable/explosive vapour-air mixture. Hygroscopic.

Explosion data

Sensitivity to mechanical impact None.

Sensitivity to static discharge Yes.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions None under normal processing.

10.4. Conditions to avoid

Conditions to avoid Heat, flames and sparks. Excessive heat. Containers may rupture or explode if exposed to heat.

10.5. Incompatible materials

Incompatible materials Lead. Aluminium. Zinc. Oxidising agent. Strong acids. Strong bases. Polyethylene. Polyvinyl chloride (PVC). Nitriles.

10.6. Hazardous decomposition products

Hazardous decomposition products Carbon monoxide. Carbon dioxide (CO₂). Formaldehyde.

SECTION 11: Toxicological information**11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008****Information on likely routes of exposure****Product Information**

Inhalation Toxic by inhalation.

Eye contact May cause irritation.

Skin contact Toxic in contact with skin.

Ingestion Toxic if swallowed. MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms 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.

Acute toxicity**Numerical measures of toxicity**

Acute Toxicity Estimate (ATE) values provided as a reflection of the hazard classification.

The following values are calculated based on chapter 3.1 of the GHS document:

ATEmix (oral)	100 mg/kg
ATEmix (dermal)	300 mg/kg
ATEmix (inhalation-vapour)	3 mg/l

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Methanol	= 6200 mg/kg (Rat)	= 15840 mg/kg (Rabbit)	= 22500 ppm (Rat) 8 h = 64000 ppm (Rat) 4 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation	May cause skin irritation. Based on available data, the classification criteria are not met.
Serious eye damage/eye irritation	May cause mild to moderate irritation.
Respiratory or skin sensitisation	Based on available data, the classification criteria are not met.
Germ cell mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	Contains no ingredient listed as a carcinogen.
Reproductive toxicity	Based on available data, the classification criteria are not met.
STOT - single exposure	Causes damage to organs.
STOT - repeated exposure	Based on available data, the classification criteria are not met.
Target organ effects	Central nervous system. Optic nerve.
Aspiration hazard	Based on available data, the classification criteria are not met.

11.2. Information on other hazards**11.2.1. Endocrine disrupting properties**

Endocrine disrupting properties This product does not contain any known or suspected endocrine disruptors.

11.2.2. Other information

Other adverse effects No information available.

SECTION 12: Ecological information**12.1. Toxicity**

Ecotoxicity Avoid release to the environment.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
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Methanol 67-56-1	-	LC50: =28200mg/L (96h, Pimephales promelas) LC50: >100mg/L (96h, Pimephales promelas) LC50: 19500 - 20700mg/L (96h, Oncorhynchus mykiss) LC50: 18 - 20mL/L (96h, Oncorhynchus mykiss) LC50: 13500 - 17600mg/L (96h, Lepomis macrochirus)	-	-
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12.2. Persistence and degradability

Persistence and degradability Readily biodegradable.

12.3. Bioaccumulative potential

Bioaccumulation Not expected to bioaccumulate.

Bioconcentration factor (BCF) <10

Component Information

Chemical name	Partition coefficient
Methanol	-0.77

12.4. Mobility in soil

Mobility in soil Adsorbs on soil.

12.5. Results of PBT and vPvB assessment**PBT and vPvB assessment**

Chemical name	PBT and vPvB assessment
Methanol 67-56-1	The substance is not PBT / vPvB. PBT assessment does not apply. Further information relevant for the PBT assessment is necessary.

12.6. Endocrine disrupting properties

Endocrine disrupting properties This product does not contain any known or suspected endocrine disruptors.

12.7. Other adverse effects

Other adverse effects No information available.

SECTION 13: Disposal considerations**13.1. Waste treatment methods**

Waste from residues/unused products Do not allow into any sewer, on the ground or into any body of water. Should not be released into the environment. Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging	Recover or recycle if possible. Empty containers pose a potential fire and explosion hazard. Do not cut, puncture or weld containers.
Waste codes / waste designations according to EWC / AVV	Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. 07 01 04*.
Other information	Waste disposal according to directive 2008/98/EC, as amended, covering waste and dangerous waste.

SECTION 14: Transport information

IMDG

14.1 UN number or ID number	UN1230
14.2 UN proper shipping name	METHANOL
14.3 Transport hazard class(es)	3
Subsidiary hazard class	6.1
14.4 Packing group	II
Description	UN1230, METHANOL, 3 (6.1), II, (11°C C.C.)
14.5 Environmental hazards	Not applicable
14.6 Special Precautions for Users	
Special Provisions	279
EmS-No.	F-E, S-D
14.7 Maritime transport in bulk according to IMO instruments	No information available

RID

14.1 UN number	UN1230
14.2 UN proper shipping name	METHANOL
14.3 Transport hazard class(es)	3
Subsidiary hazard class	6.1
14.4 Packing group	II
Description	UN1230, METHANOL, 3 (6.1), II
14.5 Environmental hazards	Not applicable
14.6 Special Precautions for Users	
Special Provisions	None
Classification code	FT1

ADR

14.1 UN number or ID number	UN1230
14.2 UN proper shipping name	METHANOL
14.3 Transport hazard class(es)	3
Subsidiary hazard class	6.1
14.4 Packing group	II
Description	UN1230, METHANOL, 3 (6.1), II
14.5 Environmental hazards	Not applicable
14.6 Special Precautions for Users	
Special Provisions	279
Classification code	FT1
Tunnel restriction code	(D/E)

IATA

14.1 UN number or ID number	UN1230
14.2 UN proper shipping name	Methanol
14.3 Transport hazard class(es)	3
Subsidiary hazard class	6.1
14.4 Packing group	II

Description	UN1230, Methanol, 3 (6.1), II
14.5 Environmental hazards	Not applicable
14.6 Special Precautions for Users	
Special Provisions	A113
ERG Code	3L
Note:	None

SECTION 15: Regulatory information

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

National regulations

Denmark List of Undesirable Substances (LOUS): Solvents (used in a wide range of products)

France

Occupational Illnesses (R-463-3, France)

Chemical name	French RG number
Methanol 67-56-1	RG 84

Germany

Water hazard class (WGK) obviously hazardous to water (WGK 2)

TA Luft (German Air Pollution Control Regulation)

Class NK (Nicht Kassifiziert-Not Classified) **Technical Share of Air (%)** No information available

Netherlands

Water contaminating class (Netherlands)

Carcinogenic, mutagenic and reproductive toxic effects

Chemical name	Netherlands - List of Carcinogens	Netherlands - List of Mutagens	Netherlands - List of Reproductive Toxins
Methanol	-	-	-

European Union

Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

Take note of Directive 94/33/EC on the protection of young people at work Take note of Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work

Take note of Directive 92/85/EC on the protection of pregnant and breastfeeding women at work

Authorisations and/or restrictions on use:

This product contains one or more substance(s) subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII)

Chemical name	Restricted substance per REACH Annex XVII	Substance subject to authorisation per REACH Annex XIV
Methanol - 67-56-1	Item 69 Item 75	-

Persistent Organic Pollutants

Not applicable

Export Notification requirements

Not applicable

Dangerous substance category per Seveso Directive (2012/18/EU)

H2 - ACUTE TOXIC

H3 - STOT SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE

P5a - FLAMMABLE LIQUIDS

P5b - FLAMMABLE LIQUIDS

P5c - FLAMMABLE LIQUIDS

Named dangerous substances per Seveso Directive (2012/18/EU)

Chemical name	Lower-tier requirements (tons)	Upper-tier requirements (tons)
Methanol - 67-56-1	500	5000

Ozone-depleting substances (ODS) regulation (EC) 1005/2009

Not applicable

EU - Plant Protection Products (1107/2009/EC)

Chemical name	EU - Plant Protection Products (1107/2009/EC)
Methanol - 67-56-1	-

Biocidal Products Regulation (EU) No 528/2012 (BPR)**EU - Water Framework Directive (2000/60/EC)**

Chemical name	EU - Water Framework Directive (2000/60/EC)
Methanol - 67-56-1	-

EU - Environmental Quality Standards (2008/105/EC)

Chemical name	EU - Environmental Quality Standards (2008/105/EC)
Methanol - 67-56-1	-

International Inventories

TSCA	Listed
DSL/NDL	Listed.
EINECS/ELINCS	Listed.
ENCS	Listed.
IECSC	Listed.
KECL	Listed.
PICCS	Listed.
AIIC	Listed.

Legend:**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory**DSL/NDL** - Canadian Domestic Substances List/Non-Domestic Substances List**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances**ENCS** - Japan Existing and New Chemical Substances**IECSC** - China Inventory of Existing Chemical Substances**KECL** - Korean Existing and Evaluated Chemical Substances**PICCS** - Philippines Inventory of Chemicals and Chemical Substances**AIIC** - Australian Inventory of Industrial Chemicals**15.2. Chemical safety assessment****Chemical Safety Report**

A Chemical Safety Assessment has been carried out for this substance. Date of most recent Chemical Safety Report: 27/04/2021.

SECTION 16: Other information**Key or legend to abbreviations and acronyms used in the safety data sheet**

Full text of H-Statements referred to under section 3

H225 - Highly flammable liquid and vapour

H301 - Toxic if swallowed

H311 - Toxic in contact with skin

H331 - Toxic if inhaled

H370 - Causes damage to organs

Legend

ATE: Acute Toxicity Estimate

SVHC: Substances of Very High Concern for Authorisation:

PBT: Persistent, Bioaccumulative, and Toxic (PBT) Substances

vPvB: Very Persistent and very Bioaccumulative (vPvB) Substances

Legend Section 8: Exposure controls/personal protection

TWA TWA (time-weighted average)

Ceiling Maximum limit value

SCBA Self-contained breathing apparatus

STEL

*

H*, K*, A*, iho*,

Sk*

STEL (Short Term Exposure Limit)

Skin designation

Skin Notation

Classification procedure	
Classification according to Regulation (EC) No. 1272/2008 [CLP]	Method Used
Acute oral toxicity	Calculation method
Acute dermal toxicity	Calculation method
Acute inhalation toxicity - gas	Calculation method
Acute inhalation toxicity - vapour	Calculation method
Acute inhalation toxicity - dust/mist	Calculation method
Skin corrosion/irritation	Calculation method
Serious eye damage/eye irritation	Calculation method
Respiratory sensitisation	Calculation method
Skin sensitisation	Calculation method
Mutagenicity	Calculation method
Carcinogenicity	Calculation method
Reproductive toxicity	Calculation method
STOT - repeated exposure	Calculation method
Acute aquatic toxicity	Calculation method
Chronic aquatic toxicity	Calculation method
Aspiration hazard	Calculation method
Ozone	Calculation method

Key literature references and sources for data used to compile the SDS

Agency for Toxic Substances and Disease Registry (ATSDR)

U.S. Environmental Protection Agency ChemView Database

European Food Safety Authority (EFSA)

European Chemicals Agency (ECHA) Committee for Risk Assessment (ECHA_RAC)

European Chemicals Agency (ECHA) (ECHA_API)

EPA (Environmental Protection Agency)

Acute Exposure Guideline Level(s) (AEGL(s))

U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act

U.S. Environmental Protection Agency High Production Volume Chemicals

Food Research Journal

Hazardous Substance Database

International Uniform Chemical Information Database (IUCLID)

Japan GHS Classification

Australian National Industrial Chemicals Notification and Assessment Scheme (NICNAS)

NIOSH (National Institute for Occupational Safety and Health)

National Library of Medicine's ChemID Plus (NLM CIP)

National Library of Medicine's PubMed database (NLM PUBMED)

National Toxicology Program (NTP)

New Zealand's Chemical Classification and Information Database (CCID)

Organisation for Economic Co-operation and Development Environment, Health, and Safety Publications
Organisation for Economic Co-operation and Development High Production Volume Chemicals Programme
Organisation for Economic Co-operation and Development Screening Information Data Set
World Health Organization

Issuing Date	12-Sep-2016
Supersedes date	15-May-2023
Revision Date	17-Oct-2023
Revision Note	SDS sections updated: 1.4, 4.2, 5.3, 8.1, 15.1.

This safety data sheet complies with the requirements of Commission Regulation (EU) 2020/878 of 18 June 2020 amending Regulation (EC) No. 1907/2006

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.

End of Safety Data Sheet

Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

Product Name Methanol
Pure substance/mixture Substance
REACH registration number 01-2119433307-44-0031
EC No (EU Index No) 200-659-6
CAS No 67-56-1

Chemical name Methanol

Identified uses

Exposure scenario	Product categories [PC]	Sector of uses [SU]	Process categories [PROC]	Article categories [AC]	Environmental release categories [ERC]
ES01: Manufacture of substance	-	-	PROC1 PROC2 PROC3 PROC4 PROC8a PROC8b PROC15	-	ERC1
ES02: Formulation & (re)packing of substances and mixtures Distribution of formulations	-	-	PROC1 PROC2 PROC3 PROC4 PROC5 PROC8a PROC8b PROC9 PROC15	-	ERC2
ES03: Use as an intermediate. End use: Industrial	-	-	PROC1 PROC2 PROC3 PROC4 PROC8a PROC8b PROC15	-	ERC6a
ES04: Use as a Process chemical Distribution of substance. End use: Industrial	-	-	PROC1 PROC2 PROC3 PROC4 PROC8a PROC8b PROC9 PROC15	-	ERC4
ES05: Use as a Fuel (use in industrial settings). End use: Industrial	-	-	PROC1 PROC2 PROC3 PROC8a PROC8b PROC16 PROC19	-	ERC7
ES06: Use in Cleaning Agents (use in industrial settings). End use: Industrial	-	-	PROC1 PROC2 PROC3 PROC4 PROC7 PROC8a PROC8b PROC10	-	ERC4

ES07: Use as laboratory reagent/agent (use in industrial settings). End use: Industrial	-	-	PROC13 PROC10 PROC15	-	ERC4
ES08: Use as wastewater treatment chemical (use in industrial settings). End use: Industrial	-	-	PROC2	-	ERC7
ES09: Use in Oilfield drilling and production operations (use in industrial settings). End use: Industrial	-	-	PROC4 PROC5 PROC8a PROC8b	-	ERC7
ES10: Use as a Fuel (use in professional settings). End use: Professional	-	-	PROC1 PROC2 PROC3 PROC8a PROC8b PROC16 PROC19	-	ERC8b ERC8e
ES11: Use in Cleaning Agents (use in professional settings). End use: Professional	-	-	PROC1 PROC2 PROC3 PROC4 PROC8a PROC8b PROC10 PROC11 PROC13	-	ERC8a ERC8d
ES12: Use as laboratory reagent/agent (use in professional settings). End use: Professional	-	-	PROC10 PROC15	-	ERC8a
ES13: Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (spray products). End use: Consumer	PC4 PC35	-	-	-	ERC8a ERC8d
ES14: Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (liquid products). End use: Consumer	PC4 PC35	-	-	-	ERC8a ERC8d
ES15: Use as Fuel additive (consumer use) (outdoor use). End use: Consumer	PC13	-	-	-	ERC8e

Exposure scenario

ES01 - Manufacture of substance

Section 1 - Title

Title	ES01 - Manufacture of substance
Environmental release category(ies)	- ERC1 - Manufacture of substances
Process category(ies)	- PROC1 - Use in closed process, no likelihood of exposure - PROC2 - Use in closed, continuous process with occasional controlled exposure - PROC3 - Use in closed batch process (synthesis or formulation) - PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC15 - Use as laboratory reagent

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC1 - Manufacture of substances

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC15 - Use as laboratory reagent
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Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed PROC1, PROC3, PROC15: 240 cm ² PROC2, PROC4: 480 cm ² PROC8a, PROC8b: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1: No specific measures identified PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Local exhaust ventilation - efficiency of at least 90%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC1 - Manufacture of substances

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Dermal 20 mg/kg bw/d
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Dermal 20 mg/kg bw/d
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.013351 mg/m ³	0.000103

PROC1	Worker - combined, long-term - systemic	-	0.036193 mg/kg bw/d	0.001817
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.053403 mg/m ³	0.000411
PROC1	Worker - combined, short-term - systemic	-	0.041915 mg/kg bw/d	0.002125
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	3.338 mg/m ³	0.025675
PROC2	Worker - combined, long-term - systemic	-	0.7511 mg/kg bw/d	0.039389
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, short-term - systemic	-	2.182 mg/kg bw/d	0.116413
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC3	Worker - combined, long-term - systemic	-	1.091 mg/kg bw/d	0.058206
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, short-term - systemic	-	3.952 mg/kg bw/d	0.212254
PROC4	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC4	Worker - combined, long-term - systemic	-	3.279 mg/kg bw/d	0.17127
PROC4	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC4	Worker - combined, short-term - systemic	-	9 mg/kg bw/d	0.479365
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	12.279 mg/kg bw/d	0.650635
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	10.013 mg/m ³	0.077024

	long-term - systemic			
PROC8b	Worker - combined, long-term - systemic	-	4.173 mg/kg bw/d	0.214167
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC8b	Worker - combined, short-term - systemic	-	5.604 mg/kg bw/d	0.29119
PROC15	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC15	Worker - combined, long-term - systemic	-	1.022 mg/kg bw/d	0.054778
PROC15	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC15	Worker - combined, short-term - systemic	-	1.976 mg/kg bw/d	0.106127

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES02 - Formulation & (re)packing of substances and mixtures Distribution of formulations

Section 1 - Title

Title ES02 - Formulation & (re)packing of substances and mixtures Distribution of formulations

Environmental release category(ies) - ERC2 - Formulation of preparations (mixtures)

Process category(ies)

- PROC1 - Use in closed process, no likelihood of exposure
- PROC2 - Use in closed, continuous process with occasional controlled exposure
- PROC3 - Use in closed batch process (synthesis or formulation)
- PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
- PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
- PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
- PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
- PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
- PROC15 - Use as laboratory reagent

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC2 - Formulation of preparations (mixtures)

Product characteristics

Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)
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	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use as laboratory reagent
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed PROC1, PROC3, PROC15: 240 cm ² PROC2, PROC4, PROC5, PROC9: 480 cm ² PROC8a, PROC8b: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1: No specific measures identified PROC2, PROC3, PROC4, PROC5, PROC8a, PROC9, PROC15: Local exhaust ventilation - efficiency of at least 90% PROC8b: Local exhaust ventilation - efficiency of at least 95%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC4, PROC5 (long-term), PROC8a, PROC8b, PROC9, PROC15: Respiratory protection not applicable Gloves: APF5 80% PROC 5 (short-term): Wear a respirator providing a minimum efficiency of 90% Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC2 - Formulation of preparations (mixtures)

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term

Inhalation 130 mg/m³
 Derived No Effect Level (DNEL) Short term
 Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.013351 mg/m ³	0.000103
PROC1	Worker - combined, long-term - systemic	-	0.036193 mg/kg bw/d	0.001817
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.053403 mg/m ³	0.000411
PROC1	Worker - combined, short-term - systemic	-	0.041915 mg/kg bw/d	0.002125
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	3.338 mg/m ³	0.025675
PROC2	Worker - combined, long-term - systemic	-	0.7511 mg/kg bw/d	0.039389
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, short-term - systemic	-	2.182 mg/kg bw/d	0.116413
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC3	Worker - combined, long-term - systemic	-	1.091 mg/kg bw/d	0.058206
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, short-term - systemic	-	3.952 mg/kg bw/d	0.212254
PROC4	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC4	Worker - combined, long-term - systemic	-	3.279 mg/kg bw/d	0.17127
PROC4	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC4	Worker - combined, short-term - systemic	-	9 mg/kg bw/d	0.479365
PROC5	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143

PROC5	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC5	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC5	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC5	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC5	Worker - combined, short-term - systemic	-	4.65 mg/kg bw/d	0.239841
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	12.279 mg/kg bw/d	0.650635
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	10.013 mg/m ³	0.077024
PROC8b	Worker - combined, long-term - systemic	-	4.173 mg/kg bw/d	0.214167
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC8b	Worker - combined, short-term - systemic	-	5.604 mg/kg bw/d	0.29119
PROC9	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC9	Worker - inhalative, long-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC9	Worker - combined, long-term - systemic	-	5.186 mg/kg bw/d	0.273968
PROC9	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC9	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC9	Worker - combined, short-term - systemic	-	9 mg/kg bw/d	0.479365
PROC15	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.51349
PROC15	Worker - combined, long-term - systemic	-	1.022 mg/kg bw/d	0.054778
PROC15	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC15	Worker - combined, short-term - systemic	-	1.976 mg/kg bw/d	0.106127

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES03 - Use as an intermediate - Industrial

Section 1 - Title

Title	ES03 - Use as an intermediate - Industrial
Environmental release category(ies)	- ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
Process category(ies)	- PROC1 - Use in closed process, no likelihood of exposure - PROC2 - Use in closed, continuous process with occasional controlled exposure - PROC3 - Use in closed batch process (synthesis or formulation) - PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC15 - Use as laboratory reagent

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation
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	(charging/discharging) from/to vessels/large containers at dedicated facilities PROC15 - Use as laboratory reagent
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC1, PROC3, PROC15: 240 cm ² PROC2, PROC4: 480 cm ² PROC8a, PROC8b: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1: No specific measures identified. PROC2, PROC3, PROC4, PROC8a, PROC15: Local exhaust ventilation - efficiency of at least 90%. PROC8b: Local exhaust ventilation - efficiency of at least 95%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal,	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714

	long-term - systemic			
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.013351 mg/m ³	0.000103
PROC1	Worker - combined, long-term - systemic	-	0.036193 mg/kg bw/d	0.001817
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.053403 mg/m ³	0.000411
PROC1	Worker - combined, short-term - systemic	-	0.041915 mg/kg bw/d	0.002125
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	3.338 mg/m ³	0.025675
PROC2	Worker - combined, long-term - systemic	-	0.7511 mg/kg bw/d	0.039389
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, short-term - systemic	-	2.182 mg/kg bw/d	0.116413
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC3	Worker - combined, long-term - systemic	-	1.091 mg/kg bw/d	0.058206
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, short-term - systemic	-	3.952 mg/kg bw/d	0.212254
PROC4	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC4	Worker - combined, long-term - systemic	-	3.279 mg/kg bw/d	0.17127
PROC4	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC4	Worker - combined, short-term - systemic	-	9 mg/kg bw/d	0.479365
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	12.279 mg/kg bw/d	0.650635

PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	10.013 mg/m ³	0.077024
PROC8b	Worker - combined, long-term - systemic	-	4.173 mg/kg bw/d	0.214167
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC8b	Worker - combined, short-term - systemic	-	5.604 mg/kg bw/d	0.29119
PROC15	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC15	Worker - combined, long-term - systemic	-	1.022 mg/kg bw/d	0.054778
PROC15	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC15	Worker - combined, short-term - systemic	-	1.976 mg/kg bw/d	0.106127

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES04 - Use as a Process chemical Distribution of substance - Industrial

Section 1 - Title

Title	ES04 - Use as a Process chemical Distribution of substance - Industrial
Environmental release category(ies)	- ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
Process category(ies)	<ul style="list-style-type: none"> - PROC1 - Use in closed process, no likelihood of exposure - PROC2 - Use in closed, continuous process with occasional controlled exposure - PROC3 - Use in closed batch process (synthesis or formulation) - PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) - PROC15 - Use as laboratory reagent

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non
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	dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use as laboratory reagent
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed PROC1, PROC3, PROC15: 240 cm ² PROC2, PROC4, PROC9: 480 cm ² PROC8a, PROC8b: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1: No specific measures identified PROC2, PROC3, PROC4, PROC8a, PROC9, PROC15: Local exhaust ventilation - efficiency of at least 90% PROC8b: Local exhaust ventilation - efficiency of at least 95%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Inhalation 130 mg/m³

Derived No Effect Level (DNEL) Short term
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.013351 mg/m ³	0.000103
PROC1	Worker - combined, long-term - systemic	-	0.036193 mg/kg bw/d	0.001817
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.053403 mg/m ³	0.000411
PROC1	Worker - combined, short-term - systemic	-	0.041915 mg/kg bw/d	0.002125
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	3.338 mg/m ³	0.025675
PROC2	Worker - combined, long-term - systemic	-	0.7511 mg/kg bw/d	0.039389
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, short-term - systemic	-	2.182 mg/kg bw/d	0.116413
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC3	Worker - combined, long-term - systemic	-	1.091 mg/kg bw/d	0.058206
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, short-term - systemic	-	3.952 mg/kg bw/d	0.212254
PROC4	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC4	Worker - combined, long-term - systemic	-	3.279 mg/kg bw/d	0.17127
PROC4	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC4	Worker - combined, short-term - systemic	-	9 mg/kg bw/d	0.479365
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143

	short-term - systemic			
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	12.279 mg/kg bw/d	0.650635
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	10.013 mg/m ³	0.077024
PROC8b	Worker - combined, long-term - systemic	-	4.173 mg/kg bw/d	0.214167
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC8b	Worker - combined, short-term - systemic	-	5.604 mg/kg bw/d	0.29119
PROC9	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC9	Worker - inhalative, long-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC9	Worker - combined, long-term - systemic	-	5.186 mg/kg bw/d	0.273968
PROC9	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC9	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC9	Worker - combined, short-term - systemic	-	9 mg/kg bw/d	0.479365
PROC15	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC15	Worker - combined, long-term - systemic	-	1.022 mg/kg bw/d	0.054778
PROC15	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC15	Worker - combined, short-term - systemic	-	1.976 mg/kg bw/d	0.106127

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES05 - Use as a Fuel (use in industrial settings)

Section 1 - Title

Title	ES05 - Use as a Fuel (use in industrial settings)
Environmental release category(ies)	- ERC7 - Industrial use of substances in closed systems
Process category(ies)	- PROC1 - Use in closed process, no likelihood of exposure - PROC2 - Use in closed, continuous process with occasional controlled exposure - PROC3 - Use in closed batch process (synthesis or formulation) - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected - PROC19 - Hand-mixing with intimate contact and only PPE available

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC7 - Industrial use of substances in closed systems

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	100%
Physical form of product	Liquid

Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed PROC1, PROC3: 240 cm ² PROC2: 480 cm ² PROC8a, PROC8b: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1: No specific measures identified PROC2, PROC3, PROC8a: Local exhaust ventilation - efficiency of at least 90% PROC8b: Local exhaust ventilation - efficiency of at least 95%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC8a, PROC8b: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Process category(ies)	PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected PROC19 - Hand-mixing with intimate contact and only PPE available
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC16 (long-term): 100% PROC16 (short-term): 5-25% PROC19: 10%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	PROC 16: > 4 hours / day PROC19: 1-4 hours
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC16: 240 cm ² PROC19: 1980 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC16, PROC19: No specific measures identified
Conditions and measures related to personal protection, hygiene and health evaluation	PROC16, PROC19: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC7 - Industrial use of substances in closed systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.013351 mg/m ³	0.000103
PROC1	Worker - combined, long-term - systemic	-	0.036193 mg/kg bw/d	0.001817
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.053403 mg/m ³	0.000411
PROC1	Worker - combined, short-term - systemic	-	0.041915 mg/kg bw/d	0.002125
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	3.338 mg/m ³	0.025675
PROC2	Worker - combined, long-term - systemic	-	0.7511 mg/kg bw/d	0.039389
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, short-term - systemic	-	2.182 mg/kg bw/d	0.116413
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC3	Worker - combined, long-term - systemic	-	1.091 mg/kg bw/d	0.058206
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, short-term - systemic	-	3.952 mg/kg bw/d	0.212254

PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	12.279 mg/kg bw/d	0.650635
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	10.013 mg/m ³	0.077024
PROC8b	Worker - combined, long-term - systemic	-	4.173 mg/kg bw/d	0.214167
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC8b	Worker - combined, short-term - systemic	-	5.604 mg/kg bw/d	0.29119
PROC16	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.68571 mg/kg bw/d	0.003429
PROC16	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC16	Worker - combined, long-term - systemic	-	4.837 mg/kg bw/d	0.260175
PROC16	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.041143 mg/kg bw/d	0.002057
PROC16	Worker - inhalative, short-term - systemic	130 mg/m ³	80.105 mg/m ³	0.61619
PROC16	Worker - combined, short-term - systemic	-	11.485 mg/kg bw/d	0.618248
PROC19	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.697 mg/kg bw/d	0.084857
PROC19	Worker - inhalative, long-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC19	Worker - combined, long-term - systemic	-	4.558 mg/kg bw/d	0.238905
PROC19	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.697 mg/kg bw/d	0.084857
PROC19	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC19	Worker - combined, short-term - systemic	-	11.233 mg/kg bw/d	0.598349

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"
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Exposure scenario

ES06 - Use in Cleaning Agents (use in industrial settings)

Section 1 - Title

Title	ES06 - Use in Cleaning Agents (use in industrial settings)
Environmental release category(ies)	- ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
Process category(ies)	- PROC1 - Use in closed process, no likelihood of exposure - PROC2 - Use in closed, continuous process with occasional controlled exposure - PROC3 - Use in closed batch process (synthesis or formulation) - PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises - PROC7 - Industrial spraying - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC10 - Roller application or brushing - PROC13 - Treatment of articles by dipping and pouring

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation
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	(charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 - Roller application or brushing PROC13 - Treatment of articles by dipping and pouring
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b: 100% PROC10: 80%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed PROC1, PROC3: 240 cm ² PROC2, PROC4, PROC13: 480 cm ² PROC8a, PROC8b, PROC10: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1: No specific measures identified PROC2, PROC3, PROC4, PROC8a, PROC10, PROC13: Local exhaust ventilation - efficiency of at least 90% PROC8b: Local exhaust ventilation - efficiency of at least 95%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC13: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Process category(ies)	PROC7 - Industrial spraying
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	25%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: 1500 cm ²
Technical conditions and measures to control dispersion from source towards the worker	General ventilation, Mechanical ventilation giving at least 30%
Conditions and measures related to personal protection, hygiene and health evaluation	Half-face mask (DIN EN 140): with filter for vapours/gases Wear a respirator providing a minimum efficiency of 90% Gloves: APF5 80%
Indoor/Outdoor use	Indoor
Use in room with a volume of minimum	> 1000 m ³
Minimum room ventilation rate for handling/application (air changes per	30%

hour)	
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Inhalation 130 mg/m³

Derived No Effect Level (DNEL) Short term
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.013351 mg/m ³	0.000103
PROC1	Worker - combined, long-term - systemic	-	0.036193 mg/kg bw/d	0.001817
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.053403 mg/m ³	0.000411
PROC1	Worker - combined, short-term - systemic	-	0.041915 mg/kg bw/d	0.002125
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	3.338 mg/m ³	0.025675
PROC2	Worker - combined, long-term - systemic	-	0.7511 mg/kg bw/d	0.039389
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, short-term - systemic	-	2.182 mg/kg bw/d	0.116413
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC3	Worker - combined, long-term - systemic	-	1.091 mg/kg bw/d	0.058206
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857

	short-term - systemic			
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, short-term - systemic	-	3.952 mg/kg bw/d	0.212254
PROC4	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC4	Worker - combined, long-term - systemic	-	3.279 mg/kg bw/d	0.17127
PROC4	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.371 mg/kg bw/d	0.068571
PROC4	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC4	Worker - combined, short-term - systemic	-	9 mg/kg bw/d	0.479365
PROC7	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.143 mg/kg bw/d	0.107143
PROC7	Worker - inhalative, long-term - systemic	130 mg/m ³	19.14 mg/m ³	0.147231
PROC7	Worker - combined, long-term - systemic	-	4.877 mg/kg bw/d	0.254374
PROC7	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.143 mg/kg bw/d	0.107143
PROC7	Worker - inhalative, short-term - systemic	130 mg/m ³	19.14 mg/m ³	0.147231
PROC7	Worker - combined, short-term - systemic	-	4.877 mg/kg bw/d	0.254374
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	12.279 mg/kg bw/d	0.650635
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	10.013 mg/m ³	0.077024
PROC8b	Worker - combined, long-term - systemic	-	4.173 mg/kg bw/d	0.214167
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC8b	Worker - combined, short-term - systemic	-	5.604 mg/kg bw/d	0.29119
PROC10	Worker - dermal, long-term - systemic	20 mg/kg bw/d	4.389 mg/kg bw/d	0.219429
PROC10	Worker - inhalative, long-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC10	Worker - combined, long-term - systemic	-	8.203 mg/kg bw/d	0.424825

PROC10	Worker - dermal, short-term - systemic	20 mg/kg bw/d	4.389 mg/kg bw/d	0.219429
PROC10	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC10	Worker - combined, short-term - systemic	-	12.018 mg/kg bw/d	0.630222
PROC13	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC13	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC13	Worker - combined, long-term - systemic	-	7.511 mg/kg bw/d	0.393889
PROC13	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC13	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC13	Worker - combined, short-term - systemic	-	12.279 mg/kg bw/d	0.650635

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES07 - Use as laboratory reagent/agent (use in industrial settings)

Section 1 - Title

Title	ES07 - Use as laboratory reagent/agent (use in industrial settings)
Environmental release category(ies)	- ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles
Process category(ies)	- PROC10 - Roller application or brushing - PROC15 - Use as laboratory reagent

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure	
Process category(ies)	PROC10 - Roller application or brushing PROC15 - Use as laboratory reagent
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC10: 80% PROC15: 100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC10: 960 cm ² PROC15: 240 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC10, PROC15: Local exhaust ventilation - efficiency of at least 90%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC10, PROC15: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and	None

exposure	
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC10	Worker - dermal, long-term - systemic	20 mg/kg bw/d	4.389 mg/kg bw/d	0.219429
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC1	Worker - combined, long-term - systemic	-	8.203 mg/kg bw/d	0.424825
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	4.389 mg/kg bw/d	0.219429
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC1	Worker - combined, short-term - systemic	-	12.018 mg/kg bw/d	0.630222
PROC15	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, long-term - systemic	130 mg/m ³	6.675 mg/m ³	0.051349
PROC15	Worker - combined, long-term - systemic	-	1.022 mg/kg bw/d	0.054778
PROC15	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC15	Worker - combined, short-term - systemic	-	1.976 mg/kg bw/d	0.106127

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES08 - Use as wastewater treatment chemical (use in industrial settings)

Section 1 - Title

Title ES08 - Use as wastewater treatment chemical (use in industrial settings)

Environmental release category(ies) - ERC7 - Industrial use of substances in closed systems

Process category(ies) - PROC2 - Use in closed, continuous process with occasional controlled exposure

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC7 - Industrial use of substances in closed systems

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure	
Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC2: 480 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC2: Local exhaust ventilation - efficiency of at least 90%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC2: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC7 - Industrial use of substances in closed systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	3.338 mg/m ³	0.025675
PROC2	Worker - combined, long-term - systemic	-	0.7511 mg/kg bw/d	0.039389
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, short-term - systemic	-	2.182 mg/kg bw/d	0.116413

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES09 - Use in Oilfield drilling and production operations (use in industrial settings)

Section 1 - Title

Title	ES09 - Use in Oilfield drilling and production operations (use in industrial settings)
Environmental release category(ies)	- ERC7 - Industrial use of substances in closed systems
Process category(ies)	- PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises - PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC7 - Industrial use of substances in closed systems

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC4: 100% PROC5, PROC8a, PROC8b: 5%
Physical form of product	Liquid

Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	PROC4: 1-4 hours / day PROC5, PROC8a, PROC8b: > 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC4, PROC5: 480 cm ² PROC8a, PROC8b: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC4: Local exhaust ventilation - efficiency of at least 90% PROC5, PROC8a, PROC8b: No specific measures identified
Conditions and measures related to personal protection, hygiene and health evaluation	PROC4, PROC5, PROC8a, PROC8b: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Operational conditions	Industrial

Section 3 - Exposure estimation

Environmental release category(ies) - ERC7 - Industrial use of substances in closed systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC4	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.822857 mg/kg bw/d	0.041143
PROC4	Worker - inhalative, long-term - systemic	130 mg/m ³	8.01 mg/m ³	0.061619
PROC4	Worker - combined, long-term - systemic	-	1.967 mg/kg bw/d	0.102762
PROC4	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.822857 mg/kg bw/d	0.041143
PROC4	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC4	Worker - combined, short-term - systemic	-	8.452 mg/kg bw/d	0.451936
PROC5	Worker - dermal,	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857

	long-term - systemic			
PROC5	Worker - inhalative, long-term - systemic	130 mg/m ³	16.688 mg/m ³	0.128373
PROC5	Worker - combined, long-term - systemic	-	2.521 mg/kg bw/d	0.13523
PROC5	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC5	Worker - inhalative, short-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC5	Worker - combined, short-term - systemic	-	4.905 mg/kg bw/d	0.263603
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	16.688 mg/m ³	0.128373
PROC8a	Worker - combined, long-term - systemic	-	2.521 mg/kg bw/d	0.13523
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, short-term - systemic	-	4.905 mg/kg bw/d	0.263603
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	10.013 mg/m ³	0.077024
PROC8b	Worker - combined, long-term - systemic	-	1.568 mg/kg bw/d	0.083881
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	20.026 mg/m ³	0.154048
PROC8b	Worker - combined, short-term - systemic	-	2.998 mg/kg bw/d	0.160905

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES10 - Use as a Fuel (use in professional settings)

Section 1 - Title

Title	ES10 - Use as a Fuel (use in professional settings)
Environmental release category(ies)	<ul style="list-style-type: none"> - ERC8b - Wide dispersive indoor use of reactive substances in open systems - ERC8e - Wide dispersive outdoor use of reactive substances in open systems
Process category(ies)	<ul style="list-style-type: none"> - PROC1 - Use in closed process, no likelihood of exposure - PROC2 - Use in closed, continuous process with occasional controlled exposure - PROC3 - Use in closed batch process (synthesis or formulation) - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected - PROC19 - Hand-mixing with intimate contact and only PPE available

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC8b - Wide dispersive indoor use of reactive substances in open systems
 - ERC8e - Wide dispersive outdoor use of reactive substances in open systems

Product characteristics	
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC16 - Using material as fuel sources, limited exposure to unburned product to be expected

	PROC19 - Hand-mixing with intimate contact and only PPE available
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC1, PROC2, PROC3, PROC16 (long-term): 100% PROC8a, PROC8b: 5% PROC 16 (short-term): 5-25% PROC 19: 10%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16: > 4 hours / day PROC19: 1-4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC1, PROC3, PROC16: 240 cm ² PROC2: 480 cm ² PROC8a, PROC8b: 960 cm ² PROC19: 1980 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1, PROC8a, PROC8b, PROC16, PROC19: No specific measures identified PROC2, PROC3: Local exhaust ventilation - efficiency of at least 80%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC8a, PROC8b, PROC16, PROC19: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Minimum room ventilation rate for handling/application (air changes per hour)	30%
Remarks	Room ventilation required for PROC16 (short-term)
Operational conditions	Professional

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8b - Wide dispersive indoor use of reactive substances in open systems
- ERC8e - Wide dispersive outdoor use of reactive substances in open systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Dermal 20 mg/kg bw/d
Inhalation 130 mg/m³

Derived No Effect Level (DNEL)
Dermal
Inhalation

Short term
20 mg/kg bw/d
130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.133508 mg/m ³	0.001027
PROC1	Worker - combined, long-term - systemic	-	0.053358 mg/kg bw/d	0.002741
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.534032 mg/m ³	0.004108
PROC1	Worker - combined, short-term - systemic	-	0.110576 mg/kg bw/d	0.005822
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined, long-term - systemic	-	2.182 mg/kg bw/d	0.116413
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC2	Worker - combined, short-term - systemic	-	7.903 mg/kg bw/d	0.424508
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, long-term - systemic	-	3.952 mg/kg bw/d	0.212254
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	106.806 mg/m ³	0.821587
PROC3	Worker - combined, short-term - systemic	-	15.395 mg/kg bw/d	0.828444
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	4.905 mg/kg bw/d	0.263603
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	9.673 mg/kg bw/d	0.520349
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857

PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	16.688 mg/m ³	0.128373
PROC8b	Worker - combined, long-term - systemic	-	2.521 mg/kg bw/d	0.13523
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	33.377 mg/m ³	0.253746
PROC8b	Worker - combined, short-term - systemic	-	4.905 mg/kg bw/d	0.263603
PROC16	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, long-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC16	Worker - combined, long-term - systemic	-	9.605 mg/kg bw/d	0.516921
PROC16	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.041143 mg/kg bw/d	0.002057
PROC16	Worker - inhalative, short-term - systemic	130 mg/m ³	112.147 mg/m ³	0.862667
PROC16	Worker - combined, short-term - systemic	-	16.062 mg/kg bw/d	0.864724
PROC19	Worker - dermal, long-term - systemic	20 mg/kg bw/d	1.697 mg/kg bw/d	0.084857
PROC19	Worker - inhalative, long-term - systemic	130 mg/m ³	40.052 mg/m ³	0.308095
PROC19	Worker - combined, long-term - systemic	-	7.419 mg/kg bw/d	0.392952
PROC19	Worker - dermal, short-term - systemic	20 mg/kg bw/d	1.697 mg/kg bw/d	0.084857
PROC19	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC19	Worker - combined, short-term - systemic	-	3.604 mg/kg bw/d	0.187556

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES11 - Use in Cleaning Agents (use in professional settings)

Section 1 - Title

Title	ES11 - Use in Cleaning Agents (use in professional settings)
Environmental release category(ies)	<ul style="list-style-type: none"> - ERC8a - Wide dispersive indoor use of processing aids in open systems - ERC8d - Wide dispersive outdoor use of processing aids in open systems
Process category(ies)	<ul style="list-style-type: none"> - PROC1 - Use in closed process, no likelihood of exposure - PROC2 - Use in closed, continuous process with occasional controlled exposure - PROC3 - Use in closed batch process (synthesis or formulation) - PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises - PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities - PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities - PROC10 - Roller application or brushing - PROC11 - Non industrial spraying - PROC13 - Treatment of articles by dipping and pouring

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
 - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation
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	(charging/discharging) from/to vessels/large containers at dedicated facilities
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC1, PROC2, PROC3, PROC4: 100% PROC8a: 5% PROC8b: 10%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	PROC1, PROC2, PROC3, PROC8A, PROC8B: > 4 hours / day PROC4: 1-4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC1, PROC3: 240 cm ² PROC2, PROC4: 480 cm ² PROC8a, PROC8b: 960 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC1, PROC8a, PROC8b: No specific measures identified PROC2, PROC3, PROC4: Local exhaust ventilation - efficiency of at least 80%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC1: Respiratory protection not applicable Hand protection not applicable PROC2, PROC3, PROC4, PROC8a, PROC8b: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Minimum room ventilation rate for handling/application (air changes per hour)	30%
Remarks	Room ventilation required for PROC4 (short-term)
Operational conditions	Professional

Process category(ies)	PROC10 - Roller application or brushing PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC10: 5% PROC11: 3% PROC13: 100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	>4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC10: 960 cm ² PROC11: 1500 cm ² PROC13: 480 cm ²
Technical conditions and measures to control dispersion from source towards	PROC10, PROC11: No specific measures identified PROC13: Local exhaust ventilation - efficiency of at least 80%

the worker	
Conditions and measures related to personal protection, hygiene and health evaluation	PROC10, PROC13 (long-term): Respiratory protection not applicable Gloves: APF5 80% PROC11: Wear a half-mask respirator, selected in accordance with EN 529 Efficiency of at least 90% Gloves: APF5 90% PROC 13 (short-term): Wear a respirator providing a minimum efficiency of 90% Wear suitable gloves tested to EN 374, 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None
Indoor/Outdoor use	Indoor
Use in room with a volume of minimum	PROC11: 100-1000m3
Operational conditions	Professional

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Dermal 20 mg/kg bw/d
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Dermal 20 mg/kg bw/d
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC1	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, long-term - systemic	130 mg/m ³	0.133508 mg/m ³	0.001027
PROC1	Worker - combined, long-term - systemic	-	0.053358 mg/kg bw/d	0.002741
PROC1	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.034286 mg/kg bw/d	0.001714
PROC1	Worker - inhalative, short-term - systemic	130 mg/m ³	0.534032 mg/m ³	0.004108
PROC1	Worker - combined, short-term - systemic	-	0.110576 mg/kg bw/d	0.005822
PROC2	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC2	Worker - combined,	-	2.182 mg/kg bw/d	0.116413

	long-term - systemic			
PROC2	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC2	Worker - inhalative, short-term - systemic	130 mg/m ³	53.403 mg/m ³	0.410794
PROC2	Worker - combined, short-term - systemic	-	7.903 mg/kg bw/d	0.424508
PROC3	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, long-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC3	Worker - combined, long-term - systemic	-	3.952 mg/kg bw/d	0.212254
PROC3	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC3	Worker - inhalative, short-term - systemic	130 mg/m ³	106.806 mg/m ³	0.821587
PROC3	Worker - combined, short-term - systemic	-	15.395 mg/kg bw/d	0.828444
PROC4	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.822857 mg/kg bw/d	0.041143
PROC4	Worker - inhalative, long-term - systemic	130 mg/m ³	40.052 mg/m ³	0.308095
PROC4	Worker - combined, long-term - systemic	-	6.545 mg/kg bw/d	0.349238
PROC4	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.822857 mg/kg bw/d	0.041143
PROC4	Worker - inhalative, short-term - systemic	130 mg/m ³	18.691 mg/m ³	0.143778
PROC4	Worker - combined, short-term - systemic	-	3.493 mg/kg bw/d	0.184921
PROC8a	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8a	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8a	Worker - combined, long-term - systemic	-	4.905 mg/kg bw/d	0.263603
PROC8a	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8a	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC8a	Worker - combined, short-term - systemic	-	9.673 mg/kg bw/d	0.520349
PROC8b	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8b	Worker - inhalative, long-term - systemic	130 mg/m ³	16.688 mg/m ³	0.128373
PROC8b	Worker - combined, long-term - systemic	-	2.521 mg/kg bw/d	0.13523
PROC8b	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.137143 mg/kg bw/d	0.006857
PROC8b	Worker - inhalative, short-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC8b	Worker - combined, short-term - systemic	-	4.905 mg/kg bw/d	0.263603
PROC10	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC10	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746

PROC10	Worker - combined, long-term - systemic	-	5.042 mg/kg bw/d	0.27046
PROC10	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC10	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC10	Worker - combined, short-term - systemic	-	9.811 mg/kg bw/d	0.527206
PROC11	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.321429 mg/kg bw/d	0.016071
PROC11	Worker - inhalative, long-term - systemic	130 mg/m ³	71.54 mg/m ³	0.550308
PROC11	Worker - combined, long-term - systemic	-	10.541 mg/kg bw/d	0.566379
PROC11	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.321429 mg/kg bw/d	0.016071
PROC11	Worker - inhalative, short-term - systemic	130 mg/m ³	71.54 mg/m ³	0.550308
PROC11	Worker - combined, short-term - systemic	-	10.541 mg/kg bw/d	0.566379
PROC13	Worker - dermal, long-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC13	Worker - inhalative, long-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC13	Worker - combined, long-term - systemic	-	12.279 mg/kg bw/d	0.650635
PROC13	Worker - dermal, short-term - systemic	20 mg/kg bw/d	2.743 mg/kg bw/d	0.137143
PROC13	Worker - inhalative, short-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC13	Worker - combined, short-term - systemic	-	4.65 mg/kg bw/d	0.239841

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES12 - Use as laboratory reagent/agent (use in professional settings)

Section 1 - Title

Title	ES12 - Use as laboratory reagent/agent (use in professional settings)
Environmental release category(ies)	- ERC8a - Wide dispersive indoor use of processing aids in open systems
Process category(ies)	- PROC10 - Roller application or brushing - PROC15 - Use as laboratory reagent

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems

Product characteristics

Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of worker exposure

Control of worker exposure

Process category(ies)	PROC10 - Roller application or brushing PROC15 - Use as laboratory reagent
Exposure route	Dermal: Long-term systemic, Short-term systemic Inhalation: Long-term systemic, Short-term systemic
Covers concentrations up to	PROC10: 5% PROC15: 100%
Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Exposure duration	> 4 hours / day
Use frequency	Covers frequency up to 5 days per week
Human factors not influenced by risk management	Exposed skin surface assumed: PROC10: 960 cm ² PROC15: 240 cm ²
Technical conditions and measures to control dispersion from source towards the worker	PROC10: No specific measures identified PROC15: Local exhaust ventilation - efficiency of at least 80%
Conditions and measures related to personal protection, hygiene and health evaluation	PROC10, PROC15: Respiratory protection not applicable Gloves: APF5 80%
Organisational measures to prevent /limit releases, dispersion and exposure	None

Indoor/Outdoor use	Indoor
Operational conditions	Professional

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term
Dermal 20 mg/kg bw/d
Inhalation 130 mg/m³
Derived No Effect Level (DNEL) Short term
Dermal 20 mg/kg bw/d
Inhalation 130 mg/m³

Calculation method EasyTRA

Exposure estimation				
Process category(ies)	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PROC10	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC10	Worker - inhalative, long-term - systemic	130 mg/m ³	33.377 mg/m ³	0.256746
PROC10	Worker - combined, long-term - systemic	-	5.042 mg/kg bw/d	0.27046
PROC10	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.274286 mg/kg bw/d	0.013714
PROC10	Worker - inhalative, short-term - systemic	130 mg/m ³	66.754 mg/m ³	0.513492
PROC10	Worker - combined, short-term - systemic	-	9.811 mg/kg bw/d	0.527206
PROC15	Worker - dermal, long-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, long-term - systemic	130 mg/m ³	13.351 mg/m ³	0.102698
PROC15	Worker - combined, long-term - systemic	-	1.976 mg/kg bw/d	0.106127
PROC15	Worker - dermal, short-term - systemic	20 mg/kg bw/d	0.068571 mg/kg bw/d	0.003429
PROC15	Worker - inhalative, short-term - systemic	130 mg/m ³	26.702 mg/m ³	0.205397
PROC15	Worker - combined, short-term - systemic	-	3.883 mg/kg bw/d	0.208825

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES13 - Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (spray products)

Section 1 - Title

Title	ES13 - Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (spray products)
Environmental release category(ies)	- ERC8a - Wide dispersive indoor use of processing aids in open systems - ERC8d - Wide dispersive outdoor use of processing aids in open systems
Product category(ies)	- PC4 - Anti-freeze and de-icing products - PC35 - Washing and cleaning products (including solvent based products)

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of consumer exposure

Control of consumer exposure

Product (sub) category(ies)	PC4 - Anti-freeze and de-icing products Cleaning Short term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: cleaning
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 0.590% Molecular weight matrix: 22g/mol Mass transfer weight: 0.413m/min
Amounts used	Inhalation: 16.2g Dermal: 0.160g
Exposure duration	Inhalation: Exposure calculation result type: Mean event concentration Exposure time: 60 minutes Application duration: 10 minutes Dermal: External dose
Release area	1.71E4 cm2 @ 20°C
Covers skin contact area up to	215 cm2
Use in room with a volume of minimum	15 m3

Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h
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Product (sub) category(ies)	PC4 - Anti-freeze and de-icing products Spraying
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: spraying
Physical form of product	Liquid
Product characteristics	Spray application: Yes Product ingredient fraction by weight: 0.590%
Exposure duration	Inhalation: Exposure calculation result type: Mean event concentration Weight fraction non-volatile: 5 % Maximum diameter: 100 µm Spray duration: 13.8 s Exposure duration: 60 minutes Dermal: External dose Release duration: 28 s
Covers skin contact area up to	2200 cm ²
Remarks	Contact rate: 46 mg/min
Use in room with a volume of minimum	15 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h
Operational conditions	Room height: 2.5 m Mass generation rate: 1.6 g/s Airborne fraction: 10 % Density non-volatile: 1 % Droplet distribution: Normal, mean and standard deviation: 2.4 +/-0.370 µm Cut-off diameter: 15 µm

Product (sub) category(ies)	PC4 - Anti-freeze and de-icing products Cleaning Long term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: cleaning
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 0.590 % Molecular weight matrix: 22 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 16.2 g Dermal: 0.310 g
Exposure duration	Inhalation: Exposure calculation result type: Mean concentration on day of exposure Exposure time: 60 minutes Application duration: 10 minutes Dermal: Internal dose chronic
Use frequency	365 days per year
Release area	1.71E4 cm ² @ 20°C
Covers skin contact area up to	225 cm ²
Use in room with a volume of minimum	15 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h
Operational conditions	Dermal: Uptake fraction: 100 %

Product (sub) category(ies)	PC4 - Anti-freeze and de-icing products Spraying Long term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: spraying
Physical form of product	Liquid
Product characteristics	Spray application: Yes Product ingredient fraction by weight: 0.590 %
Exposure duration	Inhalation: Exposure calculation result type: Mean concentration on day of exposure Weight fraction non-volatile: 5 % Maximum diameter: 100 µm Spray duration: 13.8 s Exposure duration: 60 minutes Dermal: Release duration: 28 s
Use frequency	365 days per year
Covers skin contact area up to	2200 cm ²
Remarks	Contact rate: 46 mg/min.
Use in room with a volume of minimum	15 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h
Operational conditions	Inhalation: Room height: 2.5 m Mass generation rate: 0.800 g/s Airborne fraction: 20 % Density non-volatile: 1 % Droplet distribution: Normal, mean and standard deviation: 2.4 +/- 0.370 µm Cut-off diameter: 15 µm Dermal: Uptake fraction: 100 %

Product (sub) category(ies)	PC35 - Washing and cleaning products (including solvent based products) Cleaning Short term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: cleaning
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 1 % Molecular weight matrix: 22 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 16.2 g Dermal: 0.310 g
Exposure duration	Inhalation: Exposure calculation result type: Mean event concentration Exposure time: 60 minutes Application duration: 10 minutes Dermal: External dose
Release area	1.71E4 cm ² @ 20°C
Covers skin contact area up to	225 cm ²
Use in room with a volume of minimum	15 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h

Product (sub) category(ies)	PC35 - Washing and cleaning products (including solvent based products) Spraying Short term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: spraying
Physical form of product	Liquid
Product characteristics	Spray application: Yes Product ingredient fraction by weight: 1 %
Exposure duration	Inhalation: Exposure calculation result type: Mean event concentration Weight fraction non-volatile: 5% Maximum diameter: 100 µm Spray duration: 13.8 s Exposure duration: 60 minutes Dermal: External dose Release duration: 28 s
Covers skin contact area up to	2200 cm2
Remarks	Contact rate: 46 mg/min
Use in room with a volume of minimum	15 m3
Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h
Operational conditions	Inhalation: Room height: 2.5 m Mass generation rate: 1.6 g/s Airborne fraction: 10 % Density non-volatile: 1 % Droplet distribution: LogNormal, median and coefficient of variation: 2.4 +/- 0.370 µm Cut-off diameter: 15 µm

Product (sub) category(ies)	PC35 - Washing and cleaning products (including solvent based products) Cleaning Long term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: cleaning
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 5 % Molecular weight matrix: 22 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 16.2 g Dermal: 0.310 g
Exposure duration	Inhalation: Exposure calculation result type. Mean concentration on day of exposure Exposure time: 60 minutes Application duration: 10 minutes Dermal: Internal dose chronic
Use frequency	365 days per year
Release area	1.71E4 cm2 @ 20°C
Covers skin contact area up to	225 cm2
Use in room with a volume of minimum	15 m3
Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h
Operational conditions	Dermal: Uptake fraction: 100 %

Product (sub) category(ies)	PC35 - Washing and cleaning products (including solvent based products) Spraying Long term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Spray cleaner - Application: spraying
Physical form of product	Liquid
Product characteristics	Spray application: Yes Product ingredient fraction by weight: 5 %
Exposure duration	Inhalation: Exposure calculation result type: Mean concentration yearly Weight fraction non-volatile: 5 % Maximum diameter: 100 µm Spray duration: 13.8 s Exposure duration: 60 minutes Dermal: Internal dose chronic Release duration: 2824.6 s
Use frequency	365 days per year
Covers skin contact area up to	2200 cm ²
Remarks	Contact rate: 46 mg/min
Use in room with a volume of minimum	15 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	2.5 l/h
Operational conditions	Inhalation: Room height: 2.5 m Mass generation rate: 1.6 g/s Airborne fraction: 10 % Density non-volatile: 1 % Droplet distribution: LogNormal, median and coefficient of variation: 2.4 +/- 0.370 µm Cut-off diameter: 15 µm Dermal: Uptake fraction: 100 %

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term.
Dermal 4 mg/kg bw/d
Inhalation 26 mg/m³
Derived No Effect Level (DNEL) **Short term**
Dermal 4 mg/kg bw/d
Inhalation 26 mg/m³

Calculation method The Consexpo model has been used to estimate consumer exposures unless otherwise indicated

Exposure estimation

Product category(ies)	Sector(s) of use	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PC4: Spray cleaner - Application: cleaning	-	Consumer - dermal, short-term - systemic	4 mg/kg bw/d	0.014523 mg/kg bw/d	0.003631
PC4: Spray cleaner - Application: cleaning	-	Consumer - inhalative, short-term - systemic	26 mg/m ³	2.339 mg/m ³	0.089957
PC4: Spray cleaner - Application: cleaning	-	Consumer - combined, short-term - systemic	-	0.06385 mg/m ³	0.093588
PC4: Spray cleaner - Application: spraying	-	Consumer - dermal, short-term - systemic	4 mg/kg bw/d	0.001841 mg/kg bw/d	0.00046
PC4: Spray cleaner - Application: spraying	-	Consumer - inhalative, short-term - systemic	26 mg/m ³	0.295756 mg/m ³	0.011375
PC4: Spray cleaner - Application: spraying	-	Consumer - combined, short-term - systemic	-	0.007734 mg/kg bw/d	0.011835
PC4: Spray cleaner - Application: cleaning	-	Consumer - dermal, long-term - systemic	4 mg/kg bw/d	0.02658 mg/kg bw/d	0.006646
PC4: Spray cleaner - Application: cleaning	-	Consumer - inhalative, long-term - systemic	26 mg/m ³	0.097454 mg/m ³	0.003748
PC4: Spray cleaner - Application: cleaning	-	Consumer - combined, long-term - systemic	-	0.028526 mg/kg bw/d	0.010394
PC4: Spray cleaner - Application: spraying	-	Consumer - dermal, long-term - systemic	4 mg/kg bw/d	0.001841 mg/kg bw/d	0.00046
PC4: Spray cleaner - Application: spraying	-	Consumer - inhalative, long-term - systemic	26 mg/m ³	0.012323 mg/m ³	0.000474
PC4: Spray cleaner - Application: spraying	-	Consumer - combined, long-term - systemic	-	0.002086 mg/kg bw/d	0.000934
PC35: Spray cleaner - Application: cleaning	-	Consumer - dermal, short-term - systemic	4 mg/kg bw/d	0.045058 mg/kg bw/d	0.011265
PC35: Spray cleaner - Application: cleaning	-	Consumer - inhalative, short-term - systemic	26 mg/m ³	3.964 mg/m ³	0.15247
PC35: Spray cleaner - Application: cleaning	-	Consumer - combined, short-term - systemic	-	0.124045 mg/kg bw/d	0.163734
PC35: Spray cleaner - Application: spraying	-	Consumer - dermal, short-term - systemic	4 mg/kg bw/d	0.00312 mg/kg bw/d	0.00078
PC35: Spray cleaner - Application: spraying	-	Consumer - inhalative, short-term - systemic	26 mg/m ³	0.493621 mg/m ³	0.018985

PC35: Spray cleaner - Application: spraying	-	Consumer - combined, short-term - systemic	-	0.012955 mg/kg bw/d	0.019765
PC35 Spray cleaner - Application: cleaning	-	Consumer - dermal, long-term - systemic	4 mg/kg bw/d	0.225291 mg/kg bw/d	0.056323
PC35: Spray cleaner - Application: cleaning	-	Consumer - inhalative, long-term - systemic	26 mg/m ³	0.825882 mg/m ³	0.031765
PC35: Spray cleaner - Application: cleaning	-	Consumer - combined, long-term - systemic	-	0.241746 mg/kg bw/d	0.088087
PC35: Spray cleaner - Application: spraying	-	Consumer - dermal, long-term - systemic	4 mg/kg bw/d	1.574 mg/kg bw/d	0.393446
PC35: Spray cleaner - Application: spraying	-	Consumer - inhalative, long-term - systemic	26 mg/m ³	0.102838 mg/m ³	0.003955
PC35: Spray cleaner - Application: spraying	-	Consumer - combined, long-term - systemic	-	1.576 mg/kg bw/d	0.397401

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"

Exposure scenario

ES14 - Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (liquid products)

Section 1 - Title

Title	ES14 - Use in Cleaning Agents Use in De-icing and Anti-icing agents (consumer use) (liquid products)
Environmental release category(ies)	- ERC8a - Wide dispersive indoor use of processing aids in open systems - ERC8d - Wide dispersive outdoor use of processing aids in open systems
Product category(ies)	- PC4 - Anti-freeze and de-icing products - PC35 - Washing and cleaning products (including solvent based products)

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

Product characteristics

Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of consumer exposure

Control of consumer exposure

Product (sub) category(ies)	PC4 - Anti-freeze and de-icing products Short term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Liquid cleaner – Application
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 0.590 % Molecular weight matrix: 18 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 100 g Dermal: 5 g
Exposure duration	Inhalation Exposure calculation result type: Mean event concentration Exposure time: 240 minutes Application duration: 20 minutes Dermal: External dose
Release area	3.20E4 cm ² @ 20°C
Covers skin contact area up to	2200 cm ²
Use in room with a volume of minimum	58 m ³

Minimum room ventilation rate for handling/application (air changes per hour)	0.500 l/h
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Product (sub) category(ies)	PC4 - Anti-freeze and de-icing products Long term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Liquid cleaner – Application
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 0.590 % Molecular weight matrix: 18 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 100 g Dermal: 5 g
Exposure duration	Inhalation: Exposure calculation result type: Mean concentration on day of exposure Exposure time: 240 minutes Application duration: 20 minutes Dermal: Internal dose chronic
Use frequency	197 days per year
Release area	5.00E4 cm2 @ 20°C
Covers skin contact area up to	2200 cm2
Use in room with a volume of minimum	58 m3
Minimum room ventilation rate for handling/application (air changes per hour)	0.500 l/h
Operational conditions	Dermal: Uptake fraction: 100 %

Product (sub) category(ies)	PC35 - Washing and cleaning products (including solvent based products) Short term
Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Liquid cleaner – Application
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 1 % Molecular weight matrix: 18 g/mol Mass transfer weight: 0.170 m/min.
Amounts used	Inhalation: 100 g Dermal: 5 g
Exposure duration	Inhalation: Exposure calculation result type: Mean event concentration Exposure time: 240 minutes Application duration: 20 minutes Dermal: External dose
Release area	3.20E5 cm2 @ 20°C
Covers skin contact area up to	2200 cm2
Use in room with a volume of minimum	58 m3
Minimum room ventilation rate for handling/application (air changes per hour)	0.500 l/h

Product (sub) category(ies)	PC35 - Washing and cleaning products (including solvent based products) Long term
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Calculation method	The Consexpo model has been used to estimate consumer exposures unless otherwise indicated Liquid cleaner – Application
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 1 % Molecular weight matrix: 18 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 100 g Dermal: 5 g
Exposure duration	Inhalation: Exposure calculation result type: Mean concentration on day of exposure Exposure time: 240 minutes Application duration: 20 minutes Dermal: Internal dose chronic
Use frequency	197 days per year
Release area	3.20E5 cm ² @ 20°C
Covers skin contact area up to	2200 cm ²
Use in room with a volume of minimum	58 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	0.500 l/h
Operational conditions	Dermal: Uptake fraction: 100 %

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term.
Dermal 4 mg/kg bw/d
Inhalation 26 mg/m³
Derived No Effect Level (DNEL) Short term
Dermal 4 mg/kg bw/d
Inhalation 26 mg/m³

Calculation method The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated

Exposure estimation					
Product category(ies)	Sector(s) of use	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PC4: Liquid cleaner – Application	-	Consumer - dermal, short-term - systemic	4 mg/kg bw/d	0.428779 mg/kg bw/d	0.107195
PC4: Liquid cleaner – Application	-	Consumer - inhalative, short-term - systemic	26 mg/m ³	4.333 mg/m ³	0.166671
PC4: Liquid cleaner –	-	Consumer -	-	0.774154 mg/m ³	0.273866

Application		combined, short-term - systemic			
PC4: Liquid cleaner – Application	-	Consumer - dermal, long-term - systemic	4 mg/kg bw/d	0.231423 mg/kg bw/d	0.057856
PC4: Liquid cleaner – Application	-	Consumer - inhalative, long-term - systemic	26 mg/m ³	0.722239 mg/m ³	0.027778
PC4: Liquid cleaner – Application	-	Consumer - combined, long-term - systemic	-	0.288985 mg/kg bw/d	0.085634
PC35: Liquid cleaner – Application	-	Consumer - dermal, short-term - systemic	4 mg/kg bw/d	0.726744 mg/kg bw/d	0.181686
PC35: Liquid cleaner – Application	-	Consumer - inhalative, short-term - systemic	26 mg/m ³	7.345 mg/m ³	0.282494
PC35: Liquid cleaner – Application	-	Consumer - combined, short-term - systemic	-	1.312 mg/kg bw/d	0.46418
PC35: Liquid cleaner – Application	-	Consumer - dermal, long-term - systemic	4 mg/kg bw/d	0.392243 mg/kg bw/d	0.098061
PC35: Liquid cleaner – Application	-	Consumer - inhalative, long-term - systemic	26 mg/m ³	1.224 mg/m ³	0.047082
PC35: Liquid cleaner – Application	-	Consumer - combined, long-term - systemic	-	0.489806 mg/kg bw/d	0.145143

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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”

Exposure scenario

ES15 - Use as Fuel additive (consumer use) (outdoor use)

Section 1 - Title

Title	ES15 - Use as Fuel additive (consumer use) (outdoor use)
Environmental release category(ies)	- ERC8e - Wide dispersive outdoor use of reactive substances in open systems
Product category(ies)	- PC13 - Fuels

Section 2 - Operational conditions and risk management measures

Section 2.1 - Control of environmental exposure

Environmental release category(ies) - ERC8e - Wide dispersive outdoor use of reactive substances in open systems

Product characteristics

Physical form of product	Liquid
Vapour pressure	12.8 kPa
Temperature vapour pressure	20°C
Level of dustiness	High
Volatility	High
Remarks	As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Section 2.2 - Control of consumer exposure

Control of consumer exposure

Product (sub) category(ies)	PC13 - Fuels Short term
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 2 % Molecular weight matrix: 100 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 10 g Dermal: 10 g
Exposure duration	Inhalation: Exposure calculation result type: Mean event concentration Exposure time: 10 minutes Application duration: 10 minutes Dermal: External dose
Release area	2 cm ² @ 20°C
Covers skin contact area up to	430 cm ²
Use in room with a volume of minimum	20 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	0.500 l/h

Product (sub) category(ies)	PC13 - Fuels Long term
Physical form of product	Liquid
Product characteristics	Spray application: No Product ingredient fraction by weight: 3 %

	Molecular weight matrix: 100 g/mol Mass transfer weight: 0.413 m/min.
Amounts used	Inhalation: 5.00E4 g Dermal: 10 g
Exposure duration	Inhalation: Exposure calculation result type: Mean concentration on day of exposure Exposure time: 10 minutes Application duration: 10 minutes Dermal: Internal dose chronic
Use frequency	2 days per week
Release area	2 cm ² @ 20°C
Covers skin contact area up to	430 cm ²
Use in room with a volume of minimum	20 m ³
Minimum room ventilation rate for handling/application (air changes per hour)	0.500 l/h
Operational conditions	Dermal: Uptake fraction: 100 %

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8e - Wide dispersive outdoor use of reactive substances in open systems

Predicted No Effect Concentration (PNEC) No hazard identified. With high probability the substance is not hazardous to aquatic life. No environmental risk assessment is necessary.

Remarks As no environmental hazard was identified no environmental-related exposure assessment and risk characterisation was performed

Derived No Effect Level (DNEL) Long term.
Dermal 4 mg/kg bw/d
Inhalation 26 mg/m³
Derived No Effect Level (DNEL) Short term
Dermal 4 mg/kg bw/d
Inhalation 26 mg/m³

Calculation method The Consexpo model has been used to estimate consumer exposures unless otherwise indicated

Exposure estimation					
Product category(ies)	Sector(s) of use	Exposure route	Derived No Effect Level (DNEL)	Exposure estimation	Risk characterisation ratio (RCR)
PC13	-	Consumer - dermal, short-term - systemic	4 mg/kg bw/d	2.907 mg/kg bw/d	0.726744
PC13	-	Consumer - inhalative, short-term - systemic	26 mg/m ³	0.266072 mg/m ³	0.010234
PC13	-	Consumer - combined, short-term - systemic	-	2.908 mg/m ³	0.736978
PC13	-	Consumer - dermal, long-term - systemic	4 mg/kg bw/d	1.319 mg/kg bw/d	0.32967
PC13	-	Consumer - inhalative, long-term	26 mg/m ³	0.002716 mg/m ³	0.000104

		- systemic			
PC13	-	Consumer - combined, long-term - systemic	-	1.319 mg/kg bw/d	0.329775

Section 4 - Guidance to check compliance with the exposure scenario

ECHA guidance for downstream users

Scaling method	The quantitative risk characterization for this worker exposure has been calculated by EasyTRA
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"