

SIBUR-KHIMPROM JSC

SAFETY DATA SHEET

According to Regulations (EC) 1907/2006 (REACH), (EC) 1272/2008 (CLP) & (EU) 2015/830

2-ETHYLHEXAN-1-OL

Version: 3.0
Date created: 14/01/2019

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

1.1. Product identifier

Product form: Substance
Substance name: 2- ethylhexan-1-ol
EC index No.: None
EC No.: 203-234-3
CAS-No.: 104-76-7
REACH registration No: 01-2119487289-20-0004
Formula: C₈H₁₈O
Synonyms: Isooctanol; 2-Ethyl-1-hexanol;
2-ethylhexanol (2-EH); 2-ethylhexyl alcohol
Trade names: 2-ethyl-1-hexanol

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

1.2.1. Relevant identified uses

Use of the substance/mixture: Formulation
Use in Coatings
Use in functional fluids
Use in cleaning products
Use in oil and gas field drilling
Use as an intermediate
Dilution of a concentrate
See Section 16 for a complete list of uses for which an ES is provided as an Annex

Most common technical function of substance: Main use of 2-ethyl hexanol is that of an intermediate under strictly controlled conditions. Apart from this it is used in various products and processes as functional fluid, process chemical, cleaning agent and other purposes. The detailed uses can be discerned from the list of exposure scenarios below.

1.2.2. Uses advised against

Restrictions on use: Uses other than those given in section 1.2.1 are not recommended unless an assessment is completed, prior to commencement of that use, which demonstrates that the use will be controlled.

1.3. Details of the supplier of the safety data sheet

Only representative

Company name: Gazprom Marketing and Trading France
Address: 68 avenue des Champs-Élysées, 75008, Paris, France
Contact Telephone: +33 1 42 99 73 50
Fax: +33 1 42 99 73 99
Email Address: didier.lebout@gazprom-mt.com

Manufacturer

Company name: Sibur-Khimprom JSC
Address: 98, Promishlennaya str., Perm, Perm region, 614055, Russian Federation
Contact phone: +7 3422 90-89-01 (Moscow, 7.00 to 15.00) - Chief Engineer
Fax: +7 3422 90-86-60
Email Address: mail-shp@sibur.ru
Emergency Telephone: +7 3422 90-87-05 (round the clock)

Importer: List of importers is available with the Only Representative

1.4. Emergency telephone number

Emergency phone in the country of delivery 112 (Please note that emergency numbers may vary depending upon the country of delivery though 112 remains valid as universal number.)

SECTION 2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin Irrit. 2	H315
Eye Damage 2A	H319
Acute Tox. 4	H332
STOT Single Exp. 3	H335

Full text of hazard classes and H-statements: see section 16.

2.2. Label elements

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

Hazard pictograms
(CLP):



GHS07

Signal word (CLP): Warning

Hazard statements
(CLP): H315: Causes skin irritation.
H319: Causes serious eye irritation
H332: Harmful if inhaled.
H335: May cause respiratory irritation (Affected organs: respiratory tract. Route of exposure: Inhalation).

Precautionary statements
(CLP): P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312: Call a POISON CENTER/doctor/.../if you feel unwell.
P501: Dispose of contents/container in accordance with local regulations.

EUH-statements: Not applicable?

2.3. Other hazards

Other hazards not contributing to the classification: No other hazards identified.

Assessment PBT / vPvB: According to Annex XIII of Regulation (EC) No.1907/2006 (REACH):
- not fulfilling PBT (persistent/bioaccumulative/toxic) criteria;
- not fulfilling vPvB (very persistent/very bioaccumulative) criteria.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Name	Product identifier	%	Classification [CLP]
2-ethyl-1-hexanol	(CAS-No.) 104-76-7 (EC No.) 203-234-3 (EC index No.) - None (REACH-no) 01-2119487289-20-0004	99.0-99.8	H315; H319; H332; H335

The product does not contain impurities or additives that could affect product's labelling and classification according to Regulation (EC) No 1272/2008 (CLP).

3.2. Mixtures

Not applicable

SECTION 4. FIRST-AID MEASURES

4.1. Description of first aid measures

First-aid measures general

Following inhalation provide fresh air. Following skin contact rinse skin with water/shower. Remove contaminated clothing. Following eye contact rinse cautiously with water for several minutes. Following ingestion rinse mouth.

In all cases of doubt, or when symptoms persist, seek medical advice. Show this safety data sheet to the doctor in attendance.

First-aid measures after inhalation

If inhaled, remove to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

First-aid measures after skin contact

Remove contaminated clothing while protecting yourself. Rinse the affected skin areas for at least 10 to 20 minutes under running water. Finish by washing with soap and water. Get medical attention if irritation develops or persists. Wash clothing before reuse. Clean shoes thoroughly before reuse.

First-aid measures after eye contact

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

First-aid measures after ingestion

Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention

immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

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

Symptoms/effects after inhalation:	Cough, headache, weakness, dizziness, shortness of breath. Special hazard: Lung irritation.
Symptoms/effects after skin contact:	Burning sensation, redness, swelling, and/or blisters.
Symptoms/effects after eye contact:	Mild local transient irritation (conjunctival hyperemia and slight chemosis).
Symptoms/effects after ingestion:	Few or no symptoms expected. If any, nausea and diarrhoea might occur.

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

Advice to physician

Treat according to symptoms (decontamination, vital functions), no known specific antidote.

SECTION 5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media	Water spray or fog, alcohol-resistant foam, dry extinguishing media, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	Do not use water in a jet.

5.2. Special hazards arising from the substance or mixture

Fire hazard:	Substance is combustible. Fire fighting equipment must be available. The degree of risk is governed by the burning substance and the fire conditions. Combustible when exposed to heat or flame. Vapours are heavier than air.
Explosion hazard:	Vapours may form explosive mixtures with air when the substance is heated above its flash point.
Hazardous decomposition products in case of fire:	Under conditions giving incomplete combustion, hazardous gases produced may consist of carbon monoxide (CO), carbon dioxide (CO ₂). Combustion gases of organic materials must in principle be graded as inhalation poisons.

5.3. Advice for firefighters

Firefighting instructions:	In case of fire: Evacuate the area of all non-essential personnel. Fight fire remotely due to the risk of explosion. Containers exposed to intense heat from fires should be cooled with large quantities of water. Fight fire with normal precautions from a reasonable distance.
Protection during firefighting:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in confined space. Select fire fighter's clothing approved to relevant standards (in EU – EN469).
Further information:	Contaminated extinguishing water must be disposed of in accordance with official regulations.

SECTION 6. ACCIDENTAL RELEASE MEASURE

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures Remove sources of ignition. No smoking. Avoid contact with skin, eyes and clothing. Evacuate unnecessary personnel. Alert emergency personnel.

6.1.2. For emergency responders

Emergency procedures Stop or contain leak at the source if safe to do so. Avoid direct contact with released material. Stay upwind.
Keep non-involved personnel away from the area of spillage. Except in case of small spillages, the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency.
It is recommended to eliminate all ignition sources if safe to do so (e.g. electricity, sparks, fires, flares).
Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. For emergency responders: Personal protection see section 8 SDS.
If required, notify relevant authorities according to all applicable regulations.

6.2. Environmental precautions

Discharge into the environment must be avoided. Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant). Spillages or uncontrolled discharges into watercourses must be alerted to the Environment Agency or other appropriate regulatory body.

6.3. Methods and material for containment and cleaning up

Do not let product enter drains. When inside buildings or confined space, ensure adequate ventilation.

If necessary dike the product with dry earth, sand or similar non-combustible materials.

Large spillages may be cautiously covered with foam, if available, to limit fire risk. Do not use direct jets. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

Collect free product with suitable means. Transfer collected product and other contaminated materials to suitable tanks or containers for recycle, recovery or safe disposal.

In case of soil contamination, remove contaminated soil for remediation or disposal according to local regulations.

6.4. Reference to other sections

SECTION 8: Exposure controls/personal protection. SECTION 13: Disposal considerations.

SECTION 7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Precautions for safe handling Use only in a well-ventilated area. Ground and bond containers when transferring material. Vapour/air-mixtures are explosive at intense warming. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapour), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Take precautionary measures against static discharges. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or

expose empty containers to heat, sparks or open flames.
 Hygiene measures Take heed of usual occupational hygiene measures when handling chemical substances, especially wash the skin with soap and water before breaks and at the end of work and apply fatty skin-care products after washing. Avoid inhalation of vapour or mist.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Avoid all possible sources of ignition (spark or flame). Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Incompatible materials Strong oxidizing agents.

Storage area Store in a cool, dry, well-ventilated area. Keep at temperatures between 0 and 49 °C (32 and 120 °F). Storage area layout, tank design, equipment and operating procedures must comply with the relevant European, national or local legislation.

7.3. Specific end use(s)

Not applicable.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. Occupational Exposure Limits

2-ethylhexan-1-ol (CAS No.104-76-7)

	LTEL TWA ppm	LTEL TWA (MAK), mg/m ³	STEL ppm	STEL mg/m ³	Note
European Union	1	5.4			BOELV(*)
Finland	1	5.4			
Germany (AGS)	10(1)	54 (1)	10 (1) (2)	54 (1);(2)	(1) Inhalable aerosol and vapour (2) 15 minutes average value
Germany (DFG)	10(1)	54 (1)	10 (1) (2)	54 (1);(2)	(1) Inhalable aerosol and vapour (2) Reference period - 15 minutes
Poland		160		320	
Switzerland	20	110	20	110	

(*)**Bold-type:** Indicative Occupational Exposure Limit Values and limit Values for Occupational Exposure Binding Occupational Exposure Value (BOELV) - COMMISSION DIRECTIVE (EU) 2017/164 of 31 January 2017 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU.

8.1.2. DNEL/ PNEC values	
<i>2-ethylhexan-1-ol (CAS No.104-76-7)</i>	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	Low hazard (no threshold derived)
Acute - local effects, dermal	Medium hazard (no threshold derived)
Acute - local effects, inhalation	(DNEL) 53.2 mg/m ³ . (Most sensitive endpoint: irritation (respiratory tract))
Long-term - systemic effects, dermal	(DNEL) 23 mg/kg bw/day. (Most sensitive endpoint: repeated dose toxicity)
Long-term - systemic effects, inhalation	(DNEL) 12.8 mg/m ³ (Most sensitive endpoint: repeated dose toxicity)
Long-term - local effects, dermal	Medium hazard (no threshold derived)
Long-term - local effects, inhalation	(DNEL) 53.2 mg/m ³ . (Most sensitive endpoint: irritation (respiratory tract))
Eyes, local effects	Medium hazard (no threshold derived)
DNEL/DMEL (General population)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	Low hazard (no threshold derived)
Acute - systemic effects, oral	No hazard identified
Acute - local effects, dermal	Medium hazard (no threshold derived)
Acute - local effects, inhalation	(DNEL) 26.6 mg/m ³ . (Most sensitive endpoint: irritation (respiratory tract))
Long-term - systemic effects, dermal	(DNEL) 11.4 mg/kg bw/day. (Most sensitive endpoint: repeated dose toxicity)
Long-term - systemic effects, inhalation	(DNEL) 2.3 mg/m ³ . (Most sensitive endpoint: repeated dose toxicity)
Long-term - systemic effects, oral	(DNEL) 1.1 mg/kg bw/day. (Most sensitive endpoint: repeated dose toxicity)
Long-term - local effects, dermal	Medium hazard (no threshold derived)
Long-term - local effects, inhalation	(DNEL) 26.6 mg/m ³ . (Most sensitive endpoint: irritation (respiratory tract))
Eyes, local effects	Medium hazard (no threshold derived)
PNEC (water)	
PNEC aqua (freshwater)	0.017 mg/L
PNEC aqua (marine water)	0.0017 mg/L
PNEC aqua (intermittent, freshwater)	0.17 mg/L
PNEC (Sediment)	
PNEC sediment (freshwater)	0.284 mg/kg sediment dw
PNEC sediment (marine water)	0.0284 mg/kg sediment dw
PNEC (Soil)	
PNEC soil	0.047 mg/kg soil dw
PNEC (Oral)	
PNEC oral (secondary poisoning)	55 mg/kg food
PNEC (STP)	
PNEC sewage treatment plant	10 mg/L

8.2. Exposure controls

Appropriate engineering controls:

Use explosion-proof ventilation equipment. Provide easy access to water supply and eye wash facilities. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Hand protection:

Chemical resistant protective gloves (EN 374). Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374):

butyl rubber (butyl) - 0.7 mm coating thickness;

nitrile rubber (NBR) - 0.4 mm coating thickness.

Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing. Manufacturer's directions for use should be observed because of great diversity of types.

Eye protection:

Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face. Equipment should conform to EN 166.

Skin and body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust). Possibly a work helmet; anti-static non-slip safety shoes or boots.

Respiratory protection:

Respirator with A filter. Full mask with above mentioned filter according to producers using requirements or self-contained breathing apparatus. Equipment should conform to EN 136 or EN 140 and EN 143.

Environmental exposure controls:

If possible use in closed systems. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

Other information:

Hygiene measures: Observe good industrial hygiene practices. Do not get in eyes. Avoid contact with skin. Wash contaminated clothing before reuse. When using do not smoke. Wash hands before breaks and immediately after handling the product.

For more information please see the relevant exposure scenario in Annex of this SDS

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state at 20 °C and 101.3 kPa	liquid Colour: colourless Odour: nearly odourless
Melting / freezing point	-89 °C (DIN ISO 3016 / ASTM D97)

Boiling point	184 °C at 1013 hPa (OECD Guideline 103)
Relative density	832.5 kg/m ³ at 20°C (DIN 51757)
Vapour pressure	93 Pa at 20°C (OECD 104, EU A.4)
Surface tension	47 Nm/m at 20 °C (concentration 0.81 g/L) (OECD Guideline 115)
Water solubility	0.9 g/L at 20 °C and pH = 5.8 (OECD Guideline 105)
Partition coefficient n-octanol/water (log value)	2.9 at 25 °C (OECD Guideline 117)
Flash point	75 °C at 1013 hPa (ASTM D 7094-04)
Flammability	Not applicable
Explosive properties	The study does not need to be conducted because there are no chemical groups present in the molecule which are associated with explosive properties.
Lower explosion limit	ca. 0.79 vol.%
Upper explosion limit	ca 43.0 vol.%
Auto-ignition temperature	280 °C at 1013 hPa (EU test method A.15)
Oxidising properties	Substances do not contain structural elements indicating oxidising properties.
Viscosity	9.8 mPa s at 20 °C (dynamic) (ISO 3219)
Granulometry	The study does not need to be conducted if the substance is marketed or used in a non solid or non granular form.
Stability in organic solvents and identity of relevant degradation products	Not available.
Dissociation constant	pKa 15.75

9.2. Other information

Not available.

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

Vapours may form explosive mixture with air. No hazardous reactions if stored and handled as prescribed/indicated. Hazardous polymerisation does not occur.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Reacts violently with strong oxidisers.

10.4. Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

10.5. Incompatible materials

Strong oxidizing agents.

10.6. Hazardous decomposition products

No hazardous decomposition products if stored and handled as prescribed/indicated. Thermal decomposition or combustion may generate smoke, carbon monoxide and carbon dioxide.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity CLP classification (Regulation (EC) No 1272/2008): Acute toxicity (Inhalation), Category 4, H332.

<i>2-ethylhexan-1-ol (CAS No.104-76-7)</i>	
LD50, oral, rat, male	2047 mg/kg bw (equivalent or similar to OECD Guideline 401)
LC50, inhalation, rat, male/female	- vapour: no mortality at 0.89 mg/L (4h) or when exposed to saturation concentration (1, 2, 4, and 8 h); - aerosol: between 1 and 4 mg/L. (equivalent or similar to OECD Guideline 403)
LD50, dermal, rat, male/female	>3000 mg/kg bw (OECD Guideline 402)
Additional information	Overall, the acute oral, inhalation, and dermal toxicity of 2 - Ethylhexanol is low and does only require classification with regard to inhalative toxicity (aerosol formation conditions) (Acute toxicity, Category 4).

Skin corrosion/irritation	Adverse effect observed (irritating). CLP classification (Regulation (EC) No 1272/2008): Skin irritation, Category 2; H315
Additional information	Overall irritation score (rabbit): 6.75 of max. 8 (mean) (Time point: 1, 24, 48, 72 hrs) (not reversible). Erythema score: 3.33 of max. 4 (mean) (Time point: 24, 48, 72 hrs) (not reversible). Edema score: 4 of max. 4 (mean) (Time point: 24, 48, 72 hrs). (OECD Guideline 404).
Serious eye damage/irritation	Adverse effect observed (irritating).CLP classification (Regulation (EC) No 1272/2008): Eye irritation, Category 2; H319.
Additional information	Studies in rabbits(OECD Guideline 405): Cornea score: 1.44 of max. 4 (mean) (Time point: 24, 48, 72 hrs) (fully reversible within: 17 days). Iris score: 0.89 of max. 2 (mean) (Time point: 24, 48, 72 hrs) (fully reversible within: 21 days). Conjunctivae score: 2.56 of max. 3 (mean) (Time point: 24, 48, 72 hrs) (fully reversible within: 21 days). Chemosis score: 0.78 of max. 4 (mean) (Time point: 24, 48, 72 hrs) (fully reversible within: 8 days).
Respiratory tract irritation	CLP classification (Regulation (EC) No 1272/2008): Specific target organ toxicity, Single Exposure, Category 3 (STOT SE 3, H335).
Additional information	Based on the available data on respiratory irritation in humans. 2 -Ethylhexanol may cause respiratory irritation at concentrations of 50 ppm or higher.
Respiratory or skin sensitisation	No adverse effect observed (not sensitising).
Additional information	There is no structural alert or experience that would indicate a sensitizing potential for primary aliphatic alcohols.
Germ cell mutagenicity	Genetic toxicity: No adverse effect observed (negative) According to Regulation (EC) no. 1272/2008 no classification for mutagenic properties is therefore r required.
Additional information	<u>In vitro genotoxicity studies:</u> Bacterial reverse mutation assay (e.g. Ames test) (gene mutation): negative (OECD Guideline 471, OECD Guideline 472). Mammalian cell gene mutation assay (gene mutation): negative (equivalent or similar to OECD Guideline 476).

In vivo genotoxicity studies:

Micronucleus assay (chromosome aberration) (mouse): negative (equivalent or similar to OECD Guideline 474).

Carcinogenicity

CLP classification (Regulation (EC) No 1272/2008): no classification required.

Additional information

<i>2-ethylhexan-1-ol (CAS No.104-76-7)</i>	
NOAEL (carcinogenicity) oral, rat, male/female	500 mg/kg bw/day (equivalent or similar to OECD Guideline 451)
NOAEL (carcinogenicity) oral, mouse, male/female	750 mg/kg bw/day (equivalent or similar to OECD Guideline 451)

Toxicity for reproduction

CLP classification (Regulation (EC) No 1272/2008): no classification required.

Additional information

<i>2-ethylhexan-1-ol (CAS No.104-76-7)</i>	
NOAEL (effects on fertility), oral, rat	149 mg/kg bw/day (OECD Guideline 416)
NOAEC (maternal toxicity), inhalation, rat	850 mg/m ³ (OECD Guideline 414)
NOAEL (developmental toxicity), subacute, oral, mouse	191 mg/kg bw/day (OECD Guideline 414)
NOAEL (developmental toxicity), subacute, dermal, rat	2520 mg/kg bw/day (OECD Guideline 414)

STOT-single exposure

STOT Single Exposure Cat. 3 (H335: May causes respiratory irritation).

Repeated dose toxicity

CLP classification (Regulation (EC) No 1272/2008): no classification required

<i>2-ethylhexan-1-ol (CAS No.104-76-7)</i>	
NOEL, subchronic, oral, rat, male/female	125 mg/kg bw/day (actual dose received) (absence of treatment-related effects on target organs) (OECD Guideline 408)
NOAEL, subchronic, oral, rat, male/female	250 mg/kg bw/day (actual dose received) (absence of treatment-related effects on target organs) (OECD Guideline 408)
NOAEC (systemic effects)), subacute, inhalation, rat	120 ppm (638.4mg/m ³) (OECD Guideline 413)

Aspiration hazard

Not available.

Other effects

Not available.

SECTION 12. ECOLOGICAL INFORMATION

12.1. Toxicity

2-ethylhexan-1-ol (CAS No.104-76-7)

Fish (Short-term toxicity)

LC50 (96h)	17.1 mg/L – <i>Leuciscus idus melanotus</i> ; <i>Golden orfe</i> (freshwater) (EU method C1)
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LC50 (96h)	28.2 mg/L - <i>Pimephales promelas</i> ; <i>Fathead minnow</i> (freshwater) (OECD Guideline 203)
Fish (Long-term toxicity)	
Not available	
Aquatic invertebrates (Short-term toxicity)	
EC50 (48 h)	39 mg/L - <i>Daphnia Magna</i> (freshwater) (EU method C2)
Aquatic invertebrates (Long-term toxicity)	
Not available	
Algae and aquatic plants	
EC50 (72 h)	11.5 mg/L- <i>Scenedesmus subspicatus</i> (freshwater) (EU Method C.3)
Toxicity to aquatic micro-organisms	
NOEC (24h)	>300mg/L - <i>Activated sludge, domestic</i> (ETAD Fermentation Tube Method)

12.2. Persistence and degradability

Abiotic degradation:	Hydrolysis: Not available. Phototransformation in air Rate constant of $1.13 \times 10^{-11} \text{ cm}^3/(\text{molecule} \times \text{s})$ and an atmospheric lifetime of 24.6 h (reaction with OH radicals).
Biodegradation	Readily biodegradable: % Degradation of test substance: 79 — 99.9 after 2 wk (O2 consumption) 100 after 2 wk (TOC removal) (equivalent or similar to OECD Guideline 301 C)
Persistence and degradability	Product is readily biodegradable according to OECD criteria. Abiotic degradation is very slight.

12.3. Environmental distribution

Adsorption soil	The log Kow of 2.9 for 2 -Ethylhexanol indicates a low potential for adsorption. In addition the substance is readily biodegradable.
Volatilization	No relevant information available.

12.4. Bioaccumulative potential

Aquatic bioaccumulation:	Low potential for bioaccumulation (log Pow < 3) BCF: 38.06 L/kg (whole body w.w.)(QSAR)
Secondary poisoning:	There is no indication of a bioaccumulation potential for the submission substance. Also, the substance is readily biodegradable. Hence, secondary poisoning is not considered relevant for the submission substance.

12.5. Mobility in soil

Biodegradation in soil:	No simulation tests in soil are required, since 2 -Ethylhexanol is readily biodegradable according to OECD criteria.
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12.6. Results of PBT and vPvB assessment

Regarding all available data on biotic and abiotic degradation, bioaccumulation and toxicity it can be stated that the substance does not fulfill the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).

12.7. Other adverse effects

Not available.

2-ethylhexan-1-ol (CAS No.104-76-7) is not on the REACH Candidate List.
 2-ethylhexan-1-ol (CAS No.104-76-7) is not on the REACH Annex XIV List.

Substance included in the Community Rolling Action Plan (CoRAP).

The substance included in the Community Rolling Action Plan (CoRAP).

Other information, restriction and prohibition regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer. Annex II - Not listed.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances- (SEVESO III): Not listed.

Directive 2013/39/EU priority substances in the field of water policy (amending Directive 2006/60/EC – Water Framework Directive and Directive 2008/105/EC on environmental quality standards in the field of water policy): Not listed.

Regulation (EC) No 850/2004 on persistent organic pollutants: Annex III – Not listed.

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals: Not listed.

15.1.2. National regulations

Not available.

15.2. Chemical safety assessment

Chemical Safety Report has been performed for 2-ethylhexan-1-ol (CAS No. 104-76-7)

SECTION 16. OTHER INFORMATION			
16.1. Indication of changes			
Version	Date of change	Section	Description of changes
1.0	01/02/2010	All	Version created according to Regulations (EC) No 1907/2006 (Article 31.1)
2.0	20/12/2010	All	Version created according to Regulation (EC) No 1272/2008 (Regulation CLP) & 453/2010
2.1	07/02/2011	1	Section #1 was updated
2.2	30/03/2012	2.2; 14-16	Sections#2.2: Other hazards subsection was added. Sections#14: UN number was changed for Land transport (ADR/ RID). Sections# 15-16 was fully updated according to recommendations of 'Guidance on the compilation of safety data sheets (version 1.0 – September 2011)'
2.3	21/08/2012	14	Sections#14: Information about Sea transport (IMDG Code) was added
3.0	14/01/2019	1-16, Annex	SDS have been corrected in according to new data of Registration dossier, Chemical Safety Report and new Transport information.
16.2. Abbreviations and acronyms			
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road		
AGS	The German Committee on Hazardous Substances		
BCF	Bioconcentration factor		

DFG	Germany Research Foundation (Deutsche Forschungsgemeinschaft - DFG)
DNEL	Derived No Effect Level
IMDG	International Maritime Dangerous Goods
ICAO-TI	Technical Instructions for the Safe Transport of Dangerous Goods by Air
K _{oc}	Adsorption coefficient
K _{ow}	octanol-water partition coefficient
LC50	Lethal Concentration to 50 % of a test population
LD50	Lethal Dose to 50% of a test population (Median Lethal Dose)
LOEC	Lowest Observable Effect Concentration
LTEL	Long Term Exposure Limit
MAK	Maximum concentration at the Workplace (Maximale Arbeitsplatzkonzentration)
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
OECD	Organization for Economic Co-operation and Development
PNEC	Predicted No Effect Concentration
PBT	Persistent, bioaccumulative, toxic chemical
vPvB	Very Persistent, Very Bioaccumulative
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
STEL	Short Term Exposure Limit
STP	sewage treatment plant
STOT	Specific Target Organ Toxicity
(STOT) RE	Repeated Exposure
(STOT) SE	Single Exposure
TWA	Time Weighted Average
UN	United Nations

16.3. Full text of H- and EUH-statements:

H315	Skin Irrit. Category 2	Causes skin irritation
H319	Eye Damage Category 2	Causes serious eye irritation.
H332	Acute Tox. Category 4	Harmful if inhaled.
H335	STOT Single Exp. Category 3	Causes irritated respiratory tract.

16.4. List of ES (exposure scenario) given in Annex to the extended SDS

ES1	F-1: Formulation
ES2	IW-1: Use at industrial site - Use in coatings - max. 25%
ES3	IW-2: Use at industrial site - Use in functional fluids - max. 25%
ES4	IW-3: Use at industrial site - Use in cleaning products
ES5	IW-4: Use at industrial site - Use in oil and gas field drilling
ES6	IW-5: Use at industrial site - Use as intermediate under non strictly controlled conditions (not SCC)
ES7	PW-1: Use by professional worker - Use in coatings - max. 5%
ES8	PW-2: Use by professional worker - Use in functional fluids - max. 25%
ES9	PW-3: Use by professional worker - Dilution of a concentrate
ES10	C-1: Consumer Use - Dilution of a concentrate

16.5. Key literature references and sources

CHEMICAL SAFETY REPORT to 2-ethylhexan-1-ol (CAS 104-76-7), 2014

GESTIS Substance Data Base: [http://gestis-](http://gestis-en.itrust.de/nxt/gateway.dll/gestis_en/000000.xml?f=templates$fn=default.htm$vid=gestiseng:sdbeng$3.0)

[en.itrust.de/nxt/gateway.dll/gestis_en/000000.xml?f=templates\\$fn=default.htm\\$vid=gestiseng:sdbeng\\$3.0](http://gestis-en.itrust.de/nxt/gateway.dll/gestis_en/000000.xml?f=templates$fn=default.htm$vid=gestiseng:sdbeng$3.0)

EU DIRECTIVES

REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Regulation (EC) No 1272/2008 REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.

Regulations. Commission regulation (EU) no 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

COMMISSION DIRECTIVE (EU) 2017/164 of 31 January 2017 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU

Training advice

Personnel handling the product has to be acquainted demonstrably with its hazardous properties, with health and environmental protection principles related to the product and first aid principles.

DISCLAIMER

This information is based on our current level of knowledge. This information may be subject to revision as new knowledge and experience becomes available, and SIBUR makes no warranties and assumes no liability in connection with any use of this information. Since SIBUR cannot be aware of all aspects of your business and the impact the REACH Regulation has for your company, SIBUR strongly encourages you to get familiar with the REACH Regulation in order to comply with its requirements and timelines.

ANNEX. EXPOSURE SCENARIOS

Exposure Scenario 1 (ES1): F-1: Formulation

Free short title	Formulation
Systematic title based on use descriptor	ERC 2; PROC 1, 2, 3, 5, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 2 - Formulation
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process - good ventilation (3-5 ACH) PROC 3 - Use in closed batch process - respiratory protection (90%) PROC 3 - Use in closed batch process - LEV (90%) PROC 5 - Mixing or blending in batch processes - enhanced ventilation (5-10 ACH) PROC 5 - Mixing or blending in batch processes - respiratory protection (90%) PROC 5 - Mixing or blending in batch processes - LEV (90%) PROC 8a - Transfer at non dedicated facilities - respiratory protection (90%) PROC 8a - Transfer at non dedicated facilities - LEV (90%) PROC 8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH) PROC 8b - Transfer at dedicated facilities - respiratory protection (90%) PROC 8b - Transfer at dedicated facilities - LEV (95%) PROC 9 - Transfer into small containers - enhanced ventilation (5-10 ACH) PROC 9 - Transfer into small containers - respiratory protection (90%) PROC 9 - Transfer into small containers - LEV (90%) PROC 15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH) PROC 15 - Use as laboratory reagent - LEV (90%)
Contributing Scenario (1) controlling environmental exposure for ERC 2	
Operational conditions	
Annual use at site:	<= 240 tonnes/year
Percentage of tonnage used at regional scale:	100 %
Daily use at site:	<= 0.8 tonnes/day
Release times per year	300 days/year
Technical and organizational conditions and measures	
Indoor/Outdoor use:	Indoor use
Process efficiency:	Process optimized for highly efficient use of raw materials (very minimal environmental release)
Equipment cleaning:	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water
On-site treatment of off-air:	Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS (e.g. thermal wet scrubber - gas removal and/or air filtration - particle removal and/or thermal oxidation and/or vapour recovery - adsorption)
On-site treatment of off-air:	Not applied (No off-site treatment of air applied) [Effectiveness Air: 0%]
On-site treatment of wastewater:	Not applied [Effectiveness Water: 0%]
Conditions and measures related to sewage treatment plant (STP)	
Municipal STP	Yes [Effectiveness Water: 88.37%]
Discharge rate of STP:	>= 2E3 m3/d
Application of the STP sludge on agricultural soil:	Yes

Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.012 mg/L	RCR = 0.717
Sediment (freshwater)	Local PEC: 0.204 mg/kg dw	RCR = 0.717
Marine water	Local PEC: 0.001 mg/L	RCR = 0.7
Sediment (marine water)	Local PEC: 0.02 mg/kg dw	RCR = 0.701
Predator (freshwater)	Local PEC: 0.39 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.037 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.02 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.093 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.027 mg/kg dw	RCR = 0.582
Predator (terrestrial)	Local PEC: 0.014 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 0.001 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 0.002 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	3.009E-4 mg/kg bw/day	0.011 mg/L
Fish	0.001 mg/kg bw/day	0.613 mg/kg ww
Leaf crops	6.372E-5 mg/kg bw/day	0.004 mg/kg ww
Root crops	1.432E-4 mg/kg bw/day	0.026 mg/kg ww
Meat	8.669E-8 mg/kg bw/day	2.016E-5 mg/kg ww
Milk	6.432E-8 mg/kg bw/day	8.026E-6 mg/kg ww
Contributing Scenario (2) controlling industrial worker exposure for PROC 1 (TRA Worker v3)		
Name of contributing scenario	1 - Use in closed process	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed system (minimal contact during routine operations)	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	

Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.054 mg/m ³	RCR < 0.01
Inhalation, local, long-term	0.054 mg/m ³	RCR < 0.01
Inhalation, local, acute	0.217 mg/m ³	RCR < 0.01
Dermal, systemic, long-term	0.007 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01
Contributing Scenario (3) controlling industrial worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408

Dermal, systemic, long-term	0.274 mg/kg bw/day	RCR = 0.012
Combined routes, systemic, long-term		RCR = 0.436
Contributing Scenario (4) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - good ventilation (3-5 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Goog general ventilation (3-5 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	11.39 mg/m³	RCR = 0.89
Inhalation, local, long-term	11.39 mg/m³	RCR = 0.214
Inhalation, local, acute	45.58 mg/m³	RCR = 0.857
Dermal, systemic, long-term	0.138 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.896
Contributing Scenario (5) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	

Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.138 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.133
Contributing Scenario (6) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031

Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.138 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.133
Contributing Scenario (7) controlling industrial worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.755
Contributing Scenario (8) controlling industrial worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	

RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.331
Contributing Scenario (9) controlling industrial worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212

Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.331
Contributing Scenario (10) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (11) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	

Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (12) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation

Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.755
Contributing Scenario (13) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.331
Contributing Scenario (14) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - LEV (95%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	

Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.357 mg/m ³	RCR = 0.106
Inhalation, local, long-term	1.357 mg/m ³	RCR = 0.026
Inhalation, local, acute	5.426 mg/m ³	RCR = 0.102
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.225
Contributing Scenario (15) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.696
Contributing Scenario (16) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.272
Contributing Scenario (17) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	

Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.272
Contributing Scenario (18) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	

Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	0.068 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.639
Contributing Scenario (19) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	0.068 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.215

Exposure Scenario 2 (ES2): IW-1: Use at industrial site - Use in coatings - max. 25%

Free short title	Formulation
Systematic title based on use descriptor	ERC 4; PROC 1, 2, 3, 5, 7, 8A, 8B, 9, 10, 13, 15
Name of contributing environmental scenario and corresponding ERC	ERC 4 - Use at industrial site
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process PROC 5 - Mixing or blending in batch processes - LEV (90%) PROC 7 - Industrial spraying - max. 25% - LEV (95%) - respiratory protection (90%) PROC 7 - Industrial spraying - max. 5% - LEV (95%) PROC 8a - Transfer at non dedicated facilities - respiratory protection (90%) PROC 8a - Transfer at non dedicated facilities - LEV (90%) PROC 8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH) PROC 8b - Transfer at dedicated facilities - respiratory protection (90%) PROC 8b - Transfer at dedicated facilities - LEV (95%) PROC 9 - Transfer into small containers - enhanced ventilation (5-10 ACH) PROC 9 - Transfer into small containers - respiratory protection (90%) PROC 9 - Transfer into small containers - LEV (90%) PROC 10 - Roller application or brushing - respiratory protection (90%) PROC 10 - Roller application or brushing - LEV (90%) PROC 13 - Treatment of articles by dipping and pouring - enhanced ventilation (5-10 ACH) PROC 13 - Treatment of articles by dipping and pouring - LEV (90%) PROC 15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH) PROC 15 - Use as laboratory reagent - LEV (90%)
Contributing Scenario (1) controlling environmental exposure for ERC 4	
Operational conditions	
Annual use at site:	<= 66 tonnes/year
Percentage of tonnage used at regional scale:	100 %
Daily use at site:	<= 0.22 tonnes/day
Release times per year	300 days/year
Technical and organizational conditions and measures	
Indoor/Outdoor use:	Indoor use
Process efficiency:	Process optimized for efficient use of raw materials
Equipment cleaning:	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water
On-site treatment of off-air:	Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS (e.g. thermal wet scrubber - gas removal and/or air filtration - particle removal and/or thermal oxidation and/or vapour recovery - adsorption)
On-site treatment of off-air:	Not applied (No off-site treatment of air applied) [Effectiveness Air: 0%]
On-site treatment of wastewater:	Not applied [Effectiveness Water: 0%]
Conditions and measures related to sewage treatment plant (STP)	
Municipal STP	Yes [Effectiveness Water: 88.37%]
Discharge rate of STP:	>= 2E3 m3/d
Application of the STP sludge on agricultural soil:	Yes
Conditions and measures related to treatment of waste (including article waste)	
Particular considerations on the waste treatment	No (low risk) (ERC based assessment demonstrating control of risk with

operations:	default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.012 mg/L	RCR = 0.696
Sediment (freshwater)	Local PEC: 0.198 mg/kg dw	RCR = 0.696
Marine water	Local PEC: 0.001 mg/L	RCR = 0.68
Sediment (marine water)	Local PEC: 0.019 mg/kg dw	RCR = 0.68
Predator (freshwater)	Local PEC: 0.382 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.037 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.019 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.09 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.034 mg/kg dw	RCR = 0.724
Predator (terrestrial)	Local PEC: 0.027 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 0.05 mg/m ³	RCR = 0.022
Man via Environment - Oral	Exposure via food consumption: 0.004 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR = 0.025
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	2.927E-4 mg/kg bw/day	0.01 mg/L
Fish	9.796E-4 mg/kg bw/day	0.596 mg/kg ww
Leaf crops	0.002 mg/kg bw/day	0.126 mg/kg ww
Root crops	2.77E-4 mg/kg bw/day	0.05 mg/kg ww
Meat	1.301E-6 mg/kg bw/day	3.025E-4 mg/kg ww
Milk	9.651E-7 mg/kg bw/day	1.204E-4 mg/kg ww
Contributing Scenario (2) controlling industrial worker exposure for PROC 1 (TRA Worker v3)		
Name of contributing scenario	1 - Use in closed process	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed system (minimal contact during routine operations)	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		

Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.033 mg/m ³	RCR < 0.01
Inhalation, local, long-term	0.033 mg/m ³	RCR < 0.01
Inhalation, local, acute	0.13 mg/m ³	RCR < 0.01
Dermal, systemic, long-term	0.004 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01
Contributing Scenario (3) controlling industrial worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	0.164 mg/kg bw/day	RCR < 0.01

Combined routes, systemic, long-term		RCR = 0.262
Contributing Scenario (4) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	9.767 mg/m ³	RCR = 0.763
Inhalation, local, long-term	9.767 mg/m ³	RCR = 0.184
Inhalation, local, acute	39.07 mg/m ³	RCR = 0.734
Dermal, systemic, long-term	0.083 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.767
Contributing Scenario (5) controlling industrial worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	

Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.199
Contributing Scenario (6) controlling industrial worker exposure for PROC 7 (TRA Worker v3)		
Name of contributing scenario	7 - Industrial spraying - max. 25% - LEV (95%) - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands and upper wrists (1500 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031

Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	5.143 mg/kg bw/day)	RCR = 0.224
Combined routes, systemic, long-term		RCR = 0.351
Contributing Scenario (7) controlling industrial worker exposure for PROC 7 (TRA Worker v3)		
Name of contributing scenario	7 - Industrial spraying - max. 5% - LEV (95%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands and upper wrists (1500 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	1.714 mg/kg bw/day	RCR = 0.075
Combined routes, systemic, long-term		RCR = 0.498
Contributing Scenario (8) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	

Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.326
Contributing Scenario (9) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061

Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.326
Contributing Scenario (10) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	4.884 mg/m ³	RCR = 0.382
Inhalation, local, long-term	4.884 mg/m ³	RCR = 0.092
Inhalation, local, acute	19.53 mg/m ³	RCR = 0.367
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.453
Contributing Scenario (11) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	

Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.199
Contributing Scenario (12) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - LEV (95%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation

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Inhalation, systemic, long-term	0.814 mg/m³	RCR = 0.064
Inhalation, local, long-term	0.814 mg/m³	RCR = 0.015
Inhalation, local, acute	3.256 mg/m³	RCR = 0.061
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.135
Contributing Scenario (13) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	4.884 mg/m³	RCR = 0.382
Inhalation, local, long-term	4.884 mg/m³	RCR = 0.092
Inhalation, local, acute	19.53 mg/m³	RCR = 0.367
Dermal, systemic, long-term	0.823 mg/kg bw/day	RCR = 0.036
Combined routes, systemic, long-term		RCR = 0.417
Contributing Scenario (14) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	

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Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.823 mg/kg bw/day	RCR = 0.036
Combined routes, systemic, long-term		RCR = 0.163
Contributing Scenario (15) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.823 mg/kg bw/day	RCR = 0.036
Combined routes, systemic, long-term		RCR = 0.163
Contributing Scenario (16) controlling industrial worker exposure for PROC 10 (TRA Worker v3)		
Name of contributing scenario	10 - Roller application or brushing - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	3.292 mg/kg bw/day	RCR = 0.143
Combined routes, systemic, long-term		RCR = 0.398
Contributing Scenario (17) controlling industrial worker exposure for PROC 10 (TRA Worker v3)		
Name of contributing scenario	10 - Roller application or brushing - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	

Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	3.292 mg/kg bw/day	RCR = 0.143
Combined routes, systemic, long-term		RCR = 0.398
Contributing Scenario (18) controlling industrial worker exposure for PROC 13 (TRA Worker v3)		
Name of contributing scenario	13 - Treatment of articles by dipping and pouring - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	

Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	9.767 mg/m ³	RCR = 0.763
Inhalation, local, long-term	9.767 mg/m ³	RCR = 0.184
Inhalation, local, acute	39.07 mg/m ³	RCR = 0.734
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.835
Contributing Scenario (19) controlling industrial worker exposure for PROC 13 (TRA Worker v3)		
Name of contributing scenario	13 - Treatment of articles by dipping and pouring - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.326
Contributing Scenario (20) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	

Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	4.884 mg/m ³	RCR = 0.382
Inhalation, local, long-term	4.884 mg/m ³	RCR = 0.092
Inhalation, local, acute	19.53 mg/m ³	RCR = 0.367
Dermal, systemic, long-term	0.041 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.383
Contributing Scenario (21) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	

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Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m³	RCR = 0.122
Dermal, systemic, long-term	0.041 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.129

Exposure Scenario 3 (ES3): IW-2: Use at industrial site - Use in functional fluids - max. 25%

Free short title	Formulation	
Systematic title based on use descriptor	ERC 7; PROC 1, 2, 3, 8A, 8B, 9, 15	
Name of contributing environmental scenario and corresponding ERC	ERC 7 - Use in functional fluids (industrial)	
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process PROC 8a - Transfer at non dedicated facilities - respiratory protection (90%) PROC 8a - Transfer at non dedicated facilities - LEV (90%) PROC 8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH) PROC 8b - Transfer at dedicated facilities - respiratory protection (90%) PROC 8b - Transfer at dedicated facilities - LEV (95%) PROC 9 - Transfer into small containers - enhanced ventilation (5-10 ACH) PROC 9 - Transfer into small containers - respiratory protection (90%) PROC 9 - Transfer into small containers - LEV (90%) PROC 15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH) PROC 15 - Use as laboratory reagent - LEV (90%)	
Contributing Scenario (1) controlling environmental exposure for ERC 7		
Operational conditions		
Annual use at site:	<= 90 tonnes/year	
Percentage of tonnage used at regional scale:	100 %	
Daily use at site:	<= 4.48 tonnes/day	
Release times per year	300 days/year	
Technical and organizational conditions and measures		
Indoor/Outdoor use:	Covers indoor and outdoor use	
On-site treatment of off-air:	Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS (e.g. thermal wet scrubber - gas removal and/or air filtration - particle removal and/or thermal oxidation and/or vapour recovery - adsorption)	
On-site treatment of off-air:	Not applied (No off-site treatment of air applied) [Effectiveness Air: 0%]	
On-site treatment of wastewater:	Not applied [Effectiveness Water: 0%]	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	
Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.011 mg/L	RCR = 0.629
Sediment (freshwater)	Local PEC: 0.179 mg/kg dw	RCR = 0.63

Marine water	Local PEC: 0.001 mg/L	RCR = 0.613
Sediment (marine water)	Local PEC: 0.017 mg/kg dw	RCR = 0.613
Predator (freshwater)	Local PEC: 0.18 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.016 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.015 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.078 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.023 mg/kg dw	RCR = 0.488
Predator (terrestrial)	Local PEC: 0.012 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 6.221E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 5.578E-4 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	9.471E-5 mg/kg bw/day	0.003 mg/L
Fish	3.17E-4 mg/kg bw/day	0.193 mg/kg ww
Leaf crops	2.707E-5 mg/kg bw/day	0.002 mg/kg ww
Root crops	1.19E-4 mg/kg bw/day	0.022 mg/kg ww
Meat	3.137E-8 mg/kg bw/day	7.295E-6 mg/kg ww
Milk	2.327E-8 mg/kg bw/day	2.904E-6 mg/kg ww
Contributing Scenario (2) controlling industrial worker exposure for PROC 1 (TRA Worker v3)		
Name of contributing scenario	1 - Use in closed process	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed system (minimal contact during routine operations)	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.033 mg/m ³	RCR < 0.01
Inhalation, local, long-term	0.033 mg/m ³	RCR < 0.01
Inhalation, local, acute	0.13 mg/m ³	RCR < 0.01
Dermal, systemic, long-term	0.004 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01
Contributing Scenario (3) controlling industrial worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	0.164 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.262
Contributing Scenario (4) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	

Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	9.767 mg/m ³	RCR = 0.763
Inhalation, local, long-term	9.767 mg/m ³	RCR = 0.184
Inhalation, local, acute	39.07 mg/m ³	RCR = 0.734
Dermal, systemic, long-term	0.083 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.767
Contributing Scenario (5) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		

Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.326
Contributing Scenario (6) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.326
Contributing Scenario (7) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	

Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	4.884 mg/m ³	RCR = 0.382
Inhalation, local, long-term	4.884 mg/m ³	RCR = 0.092
Inhalation, local, acute	19.53 mg/m ³	RCR = 0.367
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.453
Contributing Scenario (8) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	

Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.199
Contributing Scenario (9) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - LEV (95%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.814 mg/m ³	RCR = 0.064
Inhalation, local, long-term	0.814 mg/m ³	RCR = 0.015
Inhalation, local, acute	3.256 mg/m ³	RCR = 0.061
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.135
Contributing Scenario (10) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		

Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	4.884 mg/m ³	RCR = 0.382
Inhalation, local, long-term	4.884 mg/m ³	RCR = 0.092
Inhalation, local, acute	19.53 mg/m ³	RCR = 0.367
Dermal, systemic, long-term	0.823 mg/kg bw/day	RCR = 0.036
Combined routes, systemic, long-term		RCR = 0.417
Contributing Scenario (11) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	

Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.823 mg/kg bw/day	RCR = 0.036
Combined routes, systemic, long-term		RCR = 0.163
Contributing Scenario (12) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.823 mg/kg bw/day	RCR = 0.036
Combined routes, systemic, long-term		RCR = 0.163
Contributing Scenario (13) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	5-25%	

Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.488 mg/m ³	RCR = 0.038
Inhalation, local, long-term	0.488 mg/m ³	RCR < 0.01
Inhalation, local, acute	1.953 mg/m ³	RCR = 0.037
Dermal, systemic, long-term	0.041 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.04
Contributing Scenario (14) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	

Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.041 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.129

Exposure Scenario 4 (ES4): IW-3: Use at industrial site - Use in cleaning products

Free short title	Formulation	
Systematic title based on use descriptor	ERC 4; PROC 2, 3, 7, 8A, 8B	
Name of contributing environmental scenario and corresponding ERC	ERC 4 - Use in cleaning products	
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure – max. 5% PROC 3 - Use in closed batch process - max. 5% PROC 7 - Industrial spraying - max. 5% - respiratory protection (90%) PROC 8a - Transfer at non dedicated facilities - respiratory protection (90%) PROC 8a - Transfer at non dedicated facilities - LEV (90%) PROC 8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH) PROC 8b - Transfer at dedicated facilities - respiratory protection (90%) PROC 8b - Transfer at dedicated facilities - LEV (95%)	
Contributing Scenario (1) controlling environmental exposure for ERC 4		
Operational conditions		
Annual use at site:	<= 0.03 tonnes/year	
Percentage of tonnage used at regional scale:	10 % <i>Per default 100% of the tonnage for an industrial use would be attributed to the region. However nature of activity (automated spray cleaning of marine cargo ships) concerning environmental assessment is more appropriately described as wide dispersive use (only 10% are assigned to one region).</i>	
Daily use at site:	<= 0.002 tonnes/day	
Release times per year	20 days/year	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	
Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.012 mg/L	RCR = 0.683
Sediment (freshwater)	Local PEC: 0.194 mg/kg dw	RCR = 0.683
Marine water	Local PEC: 0.001 mg/L	RCR = 0.666
Sediment (marine water)	Local PEC: 0.019 mg/kg dw	RCR = 0.666
Predator (freshwater)	Local PEC: 0.182 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.017 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.015 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.087 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.026 mg/kg dw	RCR = 0.543

Predator (terrestrial)	Local PEC: 0.013 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.764E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 5.749E-4 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	9.607E-5 mg/kg bw/day	0.003 mg/L
Fish	3.216E-4 mg/kg bw/day	0.196 mg/kg ww
Leaf crops	2.51E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	1.321E-4 mg/kg bw/day	0.024 mg/kg ww
Meat	3.045E-8 mg/kg bw/day	7.083E-6 mg/kg ww
Milk	2.26E-8 mg/kg bw/day	2.82E-6 mg/kg ww
Contributing Scenario (2) controlling industrial worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.085 mg/m ³	RCR = 0.085
Inhalation, local, long-term	1.085 mg/m ³	RCR = 0.02
Inhalation, local, acute	4.341 mg/m ³	RCR = 0.082
Dermal, systemic, long-term	0.055 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.087
Contributing Scenario (3) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - max. 5%	
Product characteristics		

Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	0.028 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.256
Contributing Scenario (4) controlling industrial worker exposure for PROC 7 (TRA Worker v3)		
Name of contributing scenario	7 - Industrial spraying - max. 5% - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands and upper wrists (1500 cm2)	

Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	10.85 mg/m ³	RCR = 0.848
Inhalation, local, long-term	10.85 mg/m ³	RCR = 0.204
Inhalation, local, acute	43.41 mg/m ³	RCR = 0.816
Dermal, systemic, long-term	1.714 mg/kg bw/day	RCR = 0.075
Combined routes, systemic, long-term		RCR = 0.922
Contributing Scenario (5) controlling industrial worker exposure for PROC 8 a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (6) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		

General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (7) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	

Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.755
Contributing Scenario (8) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.331
Contributing Scenario (9) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - LEV (95%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		

Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.357 mg/m ³	RCR = 0.106
Inhalation, local, long-term	1.357 mg/m ³	RCR = 0.026
Inhalation, local, acute	5.426 mg/m ³	RCR = 0.102
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.225

Exposure Scenario 5 (ES5): IW-4: Use at industrial site - Use in oil and gas field drilling

Free short title		Formulation
Systematic title based on use descriptor		ERC 4; PROC 1, 2, 3, 5, 8A, 8B, 15 & outdoor PROC 5, 8B, 15
Name of contributing environmental scenario and corresponding ERC		ERC 4 - Use in oil and gas field drilling (industrial)
Name(s) of contributing worker scenarios and corresponding PROCs		<p>PROC 1 - Use in closed process - max. 5%</p> <p>PROC 2 - Use in closed, continuous process with occasional controlled exposure – max. 5%</p> <p>PROC 3 - Use in closed batch process - max. 5%</p> <p>PROC 5 - Mixing or blending in batch processes - max. 5%</p> <p>PROC 8a - Transfer at non dedicated facilities - respiratory protection (90%)</p> <p>PROC 8a - Transfer at non dedicated facilities - LEV (90%)</p> <p>PROC 8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH)</p> <p>PROC 8b - Transfer at dedicated facilities - respiratory protection (90%)</p> <p>PROC 8b - Transfer at dedicated facilities - LEV (95%)</p> <p>PROC 15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH)</p> <p>PROC 15 - Use as laboratory reagent - LEV (90%)</p> <p>PROC 5 - Mixing or blending in batch processes - outdoor - max. 5%</p> <p>PROC 8b - Transfer at dedicated facilities - outdoor - max. 5%</p> <p>PROC 8b - Transfer at dedicated facilities - outdoor - respiratory protection (90%)</p> <p>PROC 15 - Use as laboratory reagent - outdoor - max. 5%</p> <p>PROC 15 - Use as laboratory reagent - outdoor - respiratory protection (90%)</p>
Contributing Scenario (1) controlling environmental exposure for ERC 4		
Operational conditions		
Annual use at site:	<= 0.44 tonnes/year	
Percentage of tonnage used at regional scale:	100%	
Daily use at site:	<= 0.022 tonnes/day	
Release times per year	30 days/year	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	
Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	No	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.012 mg/L	RCR = 0.696
Sediment (freshwater)	Local PEC: 0.198 mg/kg dw	RCR = 0.696
Marine water	Local PEC: 0.001 mg/L	RCR = 0.68
Sediment (marine water)	Local PEC: 0.019 mg/kg dw	RCR = 0.68
Predator (freshwater)	Local PEC: 0.182 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.017 mg/kg ww	RCR < 0.01

Top predator (marine water)	Local PEC: 0.015 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.09 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 2.787E-4 mg/kg dw	RCR < 0.01
Predator (terrestrial)	Local PEC: 0.001 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.542E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 4.483E-4 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	9.644E-5 mg/kg bw/day	0.003 mg/L
Fish	3.228E-4 mg/kg bw/day	0.196 mg/kg ww
Leaf crops	2.402E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	5.024E-6 mg/kg bw/day	9.158E-4 mg/kg ww
Meat	2.986E-8 mg/kg bw/day	6.945E-6 mg/kg ww
Milk	2.216E-8 mg/kg bw/day	2.765E-6 mg/kg ww
Contributing Scenario (2) controlling industrial worker exposure for PROC 1 (TRA Worker v3)		
Name of contributing scenario	1 - Use in closed process - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed system (minimal contact during routine operations)	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.011 mg/m³	RCR < 0.01
Inhalation, local, long-term	0.011 mg/m³	RCR < 0.01
Inhalation, local, acute	0.043 mg/m³	RCR < 0.01
Dermal, systemic, long-term	0.001 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01

Contributing Scenario (3) controlling industrial worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.085 mg/m ³	RCR = 0.085
Inhalation, local, long-term	1.085 mg/m ³	RCR = 0.02
Inhalation, local, acute	4.341 mg/m ³	RCR = 0.082
Dermal, systemic, long-term	0.055 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.087
Contributing Scenario (4) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		

Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	0.028 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.256
Contributing Scenario (5) controlling industrial worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.448
Contributing Scenario (6) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	

Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (7) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	

Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (8) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.755
Contributing Scenario (9) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		

Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.331
Contributing Scenario (10) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - LEV (95%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		

Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.357 mg/m ³	RCR = 0.106
Inhalation, local, long-term	1.357 mg/m ³	RCR = 0.026
Inhalation, local, acute	5.426 mg/m ³	RCR = 0.102
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.225
Contributing Scenario (11) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	0.068 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.639
Contributing Scenario (12) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	

Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	0.068 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.215
Contributing Scenario (13) controlling industrial worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - outdoor max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
Containment:	No	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	No [Effectiveness Dermal: 0%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Outdoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		

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Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.798 mg/m ³	RCR = 0.297
Inhalation, local, long-term	3.798 mg/m ³	RCR = 0.071
Inhalation, local, acute	15.19 mg/m ³	RCR = 0.286
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.416
Contributing Scenario (14) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - outdoor - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
Containment:	Semi-closed process with occasional controlled exposure	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Outdoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.798 mg/m ³	RCR = 0.297
Inhalation, local, long-term	3.798 mg/m ³	RCR = 0.071
Inhalation, local, acute	15.19 mg/m ³	RCR = 0.286
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.321
Contributing Scenario (15) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities – outdoor - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
Containment:	Semi-closed process with occasional controlled exposure	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness	

	Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Outdoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.899 mg/m ³	RCR = 0.148
Inhalation, local, long-term	1.899 mg/m ³	RCR = 0.036
Inhalation, local, acute	7.597 mg/m ³	RCR = 0.143
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.268
Contributing Scenario (16) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - outdoor - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
Containment:	No	
Occupational Health and Safety Management System:	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Outdoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.798 mg/m ³	RCR = 0.297
Inhalation, local, long-term	3.798 mg/m ³	RCR = 0.071
Inhalation, local, acute	15.19 mg/m ³	RCR = 0.286
Dermal, systemic, long-term	0.014 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.297
Contributing Scenario (17) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - outdoor - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	>25%	

Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
Containment:	No	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Outdoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.899 mg/m ³	RCR = 0.148
Inhalation, local, long-term	1.899 mg/m ³	RCR = 0.036
Inhalation, local, acute	7.597 mg/m ³	RCR = 0.143
Dermal, systemic, long-term	0.068 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.151

Exposure Scenario 6 (ES6): IW-5: Use at industrial site - Use as intermediate under non strictly controlled conditions (not SCC)

Free short title	Formulation
Systematic title based on use descriptor	ERC 6A; PROC 1, 2, 3, 4, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6a - Use as intermediate (not under SCC)- dry process ERC 6a - Use as intermediate (not under SCC)- wet process - for sites using less than 1000 tonnes per year ERC 6a - Use as intermediate (not under SCC)- wet process - for sites using at least 1000 tonnes or more per year
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process - good ventilation (3-5 ACH) PROC 3 - Use in closed batch process - respiratory protection (90%) PROC 3 - Use in closed batch process - LEV (90%) PROC 4 - Use in batch and other process where opportunity for exposure arises - enhanced ventilation (5-10 ACH) PROC 4 - Use in batch and other process where opportunity for exposure arises - respiratory protection (90%) PROC 4 - Use in batch and other process where opportunity for exposure arises - LEV (90%) PROC 8a - Transfer at non dedicated facilities - respiratory protection (90%) PROC 8a - Transfer at non dedicated facilities - LEV (90%) PROC 8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH) PROC 8b - Transfer at dedicated facilities - respiratory protection (90%) PROC 8b - Transfer at dedicated facilities - LEV (95%) PROC 9 - Transfer into small containers - enhanced ventilation (5-10 ACH) PROC 9 - Transfer into small containers - respiratory protection (90%) PROC 9 - Transfer into small containers - LEV (90%) PROC 15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH) PROC 15 - Use as laboratory reagent - LEV (90%)
Contributing Scenario (1) controlling environmental exposure for ERC 6a	
Name of contributing scenario	6a - Use as intermediate (not under SCC)- dry process
Operational conditions	
Annual use at site:	<= 150 tonnes/year
Percentage of tonnage used at regional scale:	10 %
Daily use at site:	<= 0.5 tonnes/day
Release times per year	300 days/year
Technical and organizational conditions and measures	
Indoor/Outdoor use:	Indoor use
Process efficiency:	Process optimized for highly efficient use of raw materials (very minimal environmental release)
Equipment cleaning:	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water
On-site treatment of off-air:	Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS (e.g. thermal wet scrubber - gas removal and/or air filtration - particle removal and/or thermal oxidation and/or vapour recovery - adsorption)
On-site treatment of off-air:	Not applied (No off-site treatment of air applied) [Effectiveness Air: 0%]
On-site treatment of wastewater:	Not applied [Effectiveness Water: 0%]
Conditions and measures related to sewage treatment plant (STP)	
Municipal STP	Yes [Effectiveness Water: 88.37%]

Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.012 mg/L	RCR = 0.683
Sediment (freshwater)	Local PEC: 0.194 mg/kg dw	RCR = 0.683
Marine water	Local PEC: 0.001 mg/L	RCR = 0.666
Sediment (marine water)	Local PEC: 0.019 mg/kg dw	RCR = 0.666
Predator (freshwater)	Local PEC: 0.376 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.036 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.019 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.087 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.026 mg/kg dw	RCR = 0.543
Predator (terrestrial)	Local PEC: 0.013 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.649E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 0.001 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	2.872E-4 mg/kg bw/day	0.01 mg/L
Fish	9.613E-4 mg/kg bw/day	0.585 mg/kg ww
Leaf crops	2.46E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	1.321E-4 mg/kg bw/day	0.024 mg/kg ww
Meat	6.174E-8 mg/kg bw/day	1.436E-5 mg/kg ww
Milk	4.581E-8 mg/kg bw/day	5.716E-6 mg/kg ww
Contributing Scenario (2) controlling industrial worker exposure for ERC 6a		
Name of contributing scenario	6a - Use as intermediate (not under SCC)- wet process - for sites using less than 1000 tonnes per year	
Operational conditions		
Annual use at site:	<= 30 tonnes/year	
Percentage of tonnage used at regional scale:	20 %	
Daily use at site:	<= 0.1 tonnes/day	
Release times per year	300 days/year	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	

Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.015 mg/L	RCR = 0.854
Sediment (freshwater)	Local PEC: 0.243 mg/kg dw	RCR = 0.854
Marine water	Local PEC: 0.001 mg/L	RCR = 0.837
Sediment (marine water)	Local PEC: 0.024 mg/kg dw	RCR = 0.837
Predator (freshwater)	Local PEC: 0.446 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.043 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.021 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.116 mg/L	RCR = 0.012
Agricultural soil	Local PEC: 0.034 mg/kg dw	RCR = 0.722
Predator (terrestrial)	Local PEC: 0.017 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.764E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 0.002 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	3.555E-4 mg/kg bw/day	0.012 mg/L
Fish	0.001 mg/kg bw/day	0.724 mg/kg ww
Leaf crops	2.514E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	1.745E-4 mg/kg bw/day	0.032 mg/kg ww
Meat	7.333E-8 mg/kg bw/day	1.705E-5 mg/kg ww
Milk	5.441E-8 mg/kg bw/day	6.789E-6 mg/kg ww
Contributing Scenario (3) controlling industrial worker exposure for ERC 6a		
Name of contributing scenario	6a - Use as intermediate (not under SCC)- wet process - for sites using at least 1000 tonnes or more per year	
Operational conditions		
Annual use at site:	<= 1.8E3 tonnes/year	
Percentage of tonnage used at regional scale:	70 %	
Daily use at site:	<= 6 tonnes/day	
Release times per year	300 days/year	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	

Discharge rate of STP:	<p>>= 1E4 m³/d</p> <p><i>Selection based on conclusion (section 5.3) of European Commission Technical Guidance Document on Risk Assessment (EUTGD) Part 4 – 2nd Edition (2003). "Based on the river flow data from France, a representative value can be chosen. The use of the 10th percentile of a river flow gives a realistic worst-case estimation of the dilution of an effluent. Therefore a default dilution parameter for chemical production sites could be the median of the 10th percentile of the river flows receiving chemical effluents, that is 4.45 m³/s. A rounded up value of 4.5 m³/s (388,800 m³/d) can be used. It must be noted that taking into account the correction factor F increases the dilution rate by a factor of nearly 3. The results obtained when the 163 "formulation" sites are taken into account do not modify the result of the study. The evaluation from Germany regarding STP effluents can be used to complete the scenario. Based on the 90 percentiles of the STP effluents it is proposed to introduce a default value of 10,000 m³/d for this parameter along with a default dilution factor of 40 for the receiving water course. Using the representative dilution factor of 40 based on the German data, a river flow of 400,000 m³/d is estimated, which is coherent with the results from the French study. Finally, it can therefore be proposed that for substances being used in chemical industry, IC2 and IC3, the parameters of the default local aquatic exposure scenario can be altered as follows: • Effluent discharge rate of STP EFFLUENT(STP) = 10,000 m³/d. • Dilution at the point of complete mixing DILUTION = 40."</i></p>	
Application of the STP sludge on agricultural soil:	No	
Marine STP:	Yes [Effectiveness Water: 88.37%] <i>Risk from environmental exposure is driven by marine water and marine sediment. Onsite STP therefore required only in case of marine discharge.</i>	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	<p>>= 4E5 m³/d</p> <p><i>Selection based on conclusion (section 5.3) of European Commission Technical Guidance Document on Risk Assessment (EUTGD) Part 4 – 2nd Edition (2003). (for further details see explanation for "Discharge rate of STP")</i></p>	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.004 mg/L	RCR = 0.251
Sediment (freshwater)	Local PEC: 0.071 mg/kg dw	RCR = 0.251
Marine water	Local PEC: 8.286E-4 mg/L	RCR = 0.487
Sediment (marine water)	Local PEC: 0.014 mg/kg dw	RCR = 0.488
Predator (freshwater)	Local PEC: 0.201 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.029 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.018 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.057 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 2.858E-4 mg/kg dw	RCR < 0.01
Predator (terrestrial)	Local PEC: 0.001 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.855E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 5.303E-4 mg/kg bw/day	RCR < 0.01

Man via environment - combined routes		RCR < 0.01
INSERTION: with the same conditions of use except without onsite sewage treatment plant and no discharge to marine water safe use can be calculated RCRs		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.015 mg/L	RCR = 0.887
Sediment (freshwater)	Local PEC: 0.252 mg/kg dw	RCR = 0.887
Marine water	Not relevant	
Sediment (marine water)	Not relevant	
Predator (freshwater)	Local PEC: 0.469 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.133 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.04 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.489 mg/L	RCR = 0.049
Agricultural soil	Local PEC: 3.258E-4 mg/kg dw	RCR < 0.01
Predator (terrestrial)	Local PEC: 0.001 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 8.312E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 0.002 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	1.15E-4 mg/kg bw/day	0.004 mg/L
Fish	3.848E-4 mg/kg bw/day	0.234 mg/kg ww
Leaf crops	2.538E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	5.152E-6 mg/kg bw/day	9.392E-4 mg/kg ww
Meat	3.371E-8 mg/kg bw/day	7.84E-6 mg/kg ww
Milk	2.501E-8 mg/kg bw/day	3.121E-6 mg/kg ww
Contributing Scenario (4) controlling industrial worker exposure for PROC 1 (TRA Worker v3)		
Name of contributing scenario	1 - Use in closed process	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed system (minimal contact during routine operations)	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	

Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.054 mg/m ³	RCR < 0.01
Inhalation, local, long-term	0.054 mg/m ³	RCR < 0.01
Inhalation, local, acute	0.217 mg/m ³	RCR < 0.01
Dermal, systemic, long-term	0.007 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01
Contributing Scenario (5) controlling industrial worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	0.274 mg/kg bw/day	RCR = 0.012
Combined routes, systemic, long-term		RCR = 0.436
Contributing Scenario (6) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - good ventilation (3-5 ACH)	
Product characteristics		

Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Goog general ventilation (3-5 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	11.39 mg/m ³	RCR = 0.89
Inhalation, local, long-term	11.39 mg/m ³	RCR = 0.214
Inhalation, local, acute	45.58 mg/m ³	RCR = 0.857
Dermal, systemic, long-term	0.138 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.896
Contributing Scenario (7) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	

Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.138 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.133
Contributing Scenario (8) controlling industrial worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.138 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.133
Contributing Scenario (9) controlling industrial worker exposure for PROC 4 (TRA Worker v3)		
Name of contributing scenario	4 - Use in batch and other process where opportunity for exposure arises -	

	enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.696
Contributing Scenario (10) controlling industrial worker exposure for PROC 4 (TRA Worker v3)		
Name of contributing scenario	4 - Use in batch and other process where opportunity for exposure arises - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	

Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.272
Contributing Scenario (11) controlling industrial worker exposure for PROC 4 (TRA Worker v3)		
Name of contributing scenario	4 - Use in batch and other process where opportunity for exposure arises - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06

Combined routes, systemic, long-term		RCR = 0.272
Contributing Scenario (12) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (13) controlling industrial worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	

Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.543
Contributing Scenario (14) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612

Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.755
Contributing Scenario (15) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.331
Contributing Scenario (16) controlling industrial worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - LEV (95%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 95%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	

RMMs/OCs for QRA:		General: Moderate hazard
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:		Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Respiratory Protection:		No [Effectiveness Inhal: 0%]
RMMs/OCs for QRA:		PPE: Moderate hazard
Other conditions affecting workers exposure		
Place of use:		Indoor
Process temperature (for liquid):		<= 40 °C
Skin surface potentially exposed:		Two hands (960 cm ²)
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.357 mg/m ³	RCR = 0.106
Inhalation, local, long-term	1.357 mg/m ³	RCR = 0.026
Inhalation, local, acute	5.426 mg/m ³	RCR = 0.102
Dermal, systemic, long-term	2.742 mg/kg bw/day	RCR = 0.119
Combined routes, systemic, long-term		RCR = 0.225
Contributing Scenario (17) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario		9 - Transfer into small containers - enhanced ventilation (5-10 ACH)
Product characteristics		
Concentration of substance in mixture:		Substance as such
Frequency and duration of use		
Duration of activity:		< 8 hours
Technical and organisational conditions and measures		
General ventilation:		Enhanced general ventilation (5-10 air changes per hour)
Containment:		Semi-closed process with occasional controlled exposure
Local exhaust ventilation:		no [Effectiveness Inhal: 0%]
Occupational Health and Safety Management System:		Advanced
RMMs/OCs for QRA:		General: Moderate hazard
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:		Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Respiratory Protection:		No [Effectiveness Inhal: 0%]
RMMs/OCs for QRA:		PPE: Moderate hazard
Other conditions affecting workers exposure		
Place of use:		Indoor
Process temperature (for liquid):		<= 40 °C
Skin surface potentially exposed:		Two hands face (480 cm ²)
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153

Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.696
Contributing Scenario (18) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.272
Contributing Scenario (19) controlling industrial worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	

Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	1.372 mg/kg bw/day	RCR = 0.06
Combined routes, systemic, long-term		RCR = 0.272
Contributing Scenario (20) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - enhanced ventilation (5-10 ACH)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Enhanced general ventilation (5-10 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636

Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	0.068 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.639
Contributing Scenario (21) controlling industrial worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - LEV (90%)	
Product characteristics		
Concentration of substance in mixture:	Substance as such	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 90%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Advanced	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	0.068 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.215

Exposure Scenario 7 (ES7): PW-1: Use by professional worker - Use in coatings - max. 5%

Free short title	Formulation	
Systematic title based on use descriptor	ERC 8A, 8D; PROC 1, 2, 3, 5, 8A, 8B, 10, 11, 13, 15, 19	
Name of contributing environmental scenario and corresponding ERC	ERC 8d, 8a - Use in coatings (professional)	
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process PROC 5 - Mixing or blending in batch processes PROC 8a - Transfer at non dedicated facilities - LEV (80%) PROC 8b - Transfer at dedicated facilities - LEV (80%) PROC 10 - Roller application or brushing - LEV (80%) PROC 10 - Roller application or brushing - respiratory protection (90%) PROC 11 - Non industrial spraying - < 4h - respiratory protection (90%) PROC 11 - Non industrial spraying - respiratory protection (90%) - gloves with 90% efficiency PROC 13 - Treatment of articles by dipping and pouring - LEV (80%) PROC 15 - Use as laboratory reagent - LEV (80%) PROC 19 - Hand-mixing with intimate contact and only personal protective equipment available - respiratory protection (90%)	
Contributing Scenario (1) controlling environmental exposure for ERC 8D, 8A		
Operational conditions		
Percentage of tonnage used at regional scale:	10 %	
Daily use at site:	<= 0.003 tonnes/day	
Technical and organizational conditions and measures		
Indoor/Outdoor use:	Covers indoor and outdoor use	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	
Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.003 mg/L	RCR = 0.179
Sediment (freshwater)	Local PEC: 0.051 mg/kg dw	RCR = 0.179
Marine water	Local PEC: 2.765E-4 mg/L	RCR = 0.163
Sediment (marine water)	Local PEC: 0.005 mg/kg dw	RCR = 0.163
Predator (freshwater)	Local PEC: 0.173 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.016 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.015 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.002 mg/L	RCR < 0.01

2-ETHYLHEXAN-1-OL

VERSION: 3.0

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Agricultural soil	Local PEC: 7.414E-4 mg/kg dw	RCR = 0.016
Predator (terrestrial)	Local PEC: 0.001 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.537E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 4.095E-4 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	8.699E-5 mg/kg bw/day	0.003 mg/L
Fish	2.912E-4 mg/kg bw/day	0.177 mg/kg ww
Leaf crops	2.4E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	7.35E-6 mg/kg bw/day	0.001 mg/kg ww
Meat	2.829E-8 mg/kg bw/day	6.58E-6 mg/kg ww
Milk	2.099E-8 mg/kg bw/day	2.619E-6 mg/kg ww
Contributing Scenario (2) controlling professional worker exposure for PROC 1 (TRA Worker v3)		
Name of contributing scenario	1 - Use in closed process	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed system (minimal contact during routine operations)	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.011 mg/m³	RCR < 0.01
Inhalation, local, long-term	0.011 mg/m³	RCR < 0.01
Inhalation, local, acute	0.043 mg/m³	RCR < 0.01
Dermal, systemic, long-term	0.001 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01
Contributing Scenario (3) controlling professional worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure	

Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	0.055 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.426
Contributing Scenario (4) controlling professional worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	

Skin surface potentially exposed:		One hand face only (240 cm ²)
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	0.028 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.256
Contributing Scenario (5) controlling professional worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario		5 - Mixing or blending in batch processes
Product characteristics		
Concentration of substance in mixture:		1-5%
Frequency and duration of use		
Duration of activity:		< 8 hours
Technical and organisational conditions and measures		
General ventilation:		Basic general ventilation (1-3 air changes per hour)
Containment:		No
Local exhaust ventilation:		no [Effectiveness Inhal: 0%]
Occupational Health and Safety Management System:		Basic
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:		Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Respiratory Protection:		No [Effectiveness Inhal: 0%]
Other conditions affecting workers exposure		
Place of use:		Indoor
Process temperature (for liquid):		<= 40 °C
Skin surface potentially exposed:		Two hands face (480 cm ²)
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	10.85 mg/m ³	RCR = 0.848
Inhalation, local, long-term	10.85 mg/m ³	RCR = 0.204
Inhalation, local, acute	43.41 mg/m ³	RCR = 0.816
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.872
Contributing Scenario (6) controlling professional worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario		8a - Transfer at non dedicated facilities - LEV (80%)
Product characteristics		
Concentration of substance in mixture:		1-5%
Frequency and duration of use		
Duration of activity:		< 8 hours
Technical and organisational conditions and measures		
General ventilation:		Basic general ventilation (1-3 air changes per hour)

Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.448
Contributing Scenario (7) controlling professional worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - LEV (80%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.085 mg/m ³	RCR = 0.085

Inhalation, local, long-term	1.085 mg/m ³	RCR = 0.02
Inhalation, local, acute	4.341 mg/m ³	RCR = 0.082
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.109
Contributing Scenario (8) controlling professional worker exposure for PROC 10 (TRA Worker v3)		
Name of contributing scenario	10 - Roller application or brushing - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	1.097 mg/kg bw/day	RCR = 0.048
Combined routes, systemic, long-term		RCR = 0.26
Contributing Scenario (9) controlling professional worker exposure for PROC 10 (TRA Worker v3)		
Name of contributing scenario	10 - Roller application or brushing - LEV (80%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	

Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	5.426 mg/m ³	RCR = 0.424
Inhalation, local, long-term	5.426 mg/m ³	RCR = 0.102
Inhalation, local, acute	21.7 mg/m ³	RCR = 0.408
Dermal, systemic, long-term	1.097 mg/kg bw/day	RCR = 0.048
Combined routes, systemic, long-term		RCR = 0.472
Contributing Scenario (10) controlling professional worker exposure for PROC 11 (TRA Worker v3)		
Name of contributing scenario	11 - Non industrial spraying - < 4h - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands and upper wrists (1500 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	6.511 mg/m ³	RCR = 0.509
Inhalation, local, long-term	6.511 mg/m ³	RCR = 0.122
Inhalation, local, acute	43.41 mg/m ³	RCR = 0.816
Dermal, systemic, long-term	4.286 mg/kg bw/day	RCR = 0.186
Combined routes, systemic, long-term		RCR = 0.695
Contributing Scenario (11) controlling professional worker exposure for PROC 11 (TRA Worker v3)		

Name of contributing scenario	11 - Non industrial spraying - respiratory protection (90%) - gloves with 90% efficiency	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 90%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands and upper wrists (1500 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	10.85 mg/m ³	RCR = 0.848
Inhalation, local, long-term	10.85 mg/m ³	RCR = 0.204
Inhalation, local, acute	43.41 mg/m ³	RCR = 0.816
Dermal, systemic, long-term	2.143 mg/kg bw/day	RCR = 0.093
Combined routes, systemic, long-term		RCR = 0.941
Contributing Scenario (12) controlling professional worker exposure for PROC 13 (TRA Worker v3)		
Name of contributing scenario	13 - Treatment of articles by dipping and pouring - LEV (80%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	

Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.17 mg/m ³	RCR = 0.17
Inhalation, local, long-term	2.17 mg/m ³	RCR = 0.041
Inhalation, local, acute	8.682 mg/m ³	RCR = 0.163
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.193
Contributing Scenario (13) controlling professional worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - LEV (80%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.085 mg/m ³	RCR = 0.085
Inhalation, local, long-term	1.085 mg/m ³	RCR = 0.02
Inhalation, local, acute	4.341 mg/m ³	RCR = 0.082
Dermal, systemic, long-term	0.014 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.085
Contributing Scenario (14) controlling professional worker exposure for PROC 19 (TRA Worker v3)		
Name of contributing scenario	19 - Hand-mixing with intimate contact and only personal protective equipment available - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		

Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 90%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands and forearms (1980 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	2.829 mg/kg bw/day	RCR = 0.123
Combined routes, systemic, long-term		RCR = 0.335

Exposure Scenario 8 (ES8): PW-2: Use by professional worker - Use in functional fluids - max. 25%

Free short title		Formulation
Systematic title based on use descriptor		ERC 9A, 9B; PROC 1, 2, 3, 8A, 9, 15, 20
Name of contributing environmental scenario and corresponding ERC		ERC 9b, 9a - Use in functional fluids (professional)
Name(s) of contributing worker scenarios and corresponding PROCs		PROC 1 - Use in closed process PROC 2 - Use in closed, continuous process with occasional controlled exposure - respiratory protection (90%) PROC 3 - Use in closed batch process PROC 8a - Transfer at non dedicated facilities - respiratory protection (90%) PROC 9 - Transfer into small containers - LEV (80%) PROC 15 - Use as laboratory reagent - LEV (80%) PROC 20 - Heat and pressure transfer fluids in dispersive, professional use but closed system - LEV (80%)
Contributing Scenario (1) controlling environmental exposure for ERC 9b, 9A		
Operational conditions		
Percentage of tonnage used at regional scale:	10 %	
Daily use at site:	<= 0.003 tonnes/day	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	
Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.004 mg/L	RCR = 0.217
Sediment (freshwater)	Local PEC: 0.062 mg/kg dw	RCR = 0.217
Marine water	Local PEC: 3.404E-4 mg/L	RCR = 0.2
Sediment (marine water)	Local PEC: 0.006 mg/kg dw	RCR = 0.2
Predator (freshwater)	Local PEC: 0.191 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.017 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.016 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.008 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.003 mg/kg dw	RCR = 0.055
Predator (terrestrial)	Local PEC: 0.002 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.546E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 4.983E-4 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		

Type of food	Estimated daily dose	Concentration in food
Drinking water	1.053E-4 mg/kg bw/day	0.004 mg/L
Fish	3.523E-4 mg/kg bw/day	0.215 mg/kg ww
Leaf crops	2.405E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	1.667E-5 mg/kg bw/day	0.003 mg/kg ww
Meat	3.134E-8 mg/kg bw/day	7.288E-6 mg/kg ww
Milk	2.325E-8 mg/kg bw/day	2.902E-6 mg/kg ww
Contributing Scenario (2) controlling professional worker exposure for PROC 1 (TRA Worker v3)		
Name of contributing scenario		1 - Use in closed process
Product characteristics		
Concentration of substance in mixture:		5-25%
Frequency and duration of use		
Duration of activity:		< 8 hours
Technical and organisational conditions and measures		
General ventilation:		Basic general ventilation (1-3 air changes per hour)
Containment:		Closed system (minimal contact during routine operations)
Local exhaust ventilation:		no [Effectiveness Inhal: 0%]
Occupational Health and Safety Management System:		Basic
RMMs/OCs for QRA:		General: Moderate hazard
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:		Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]
Respiratory Protection:		No [Effectiveness Inhal: 0%]
RMMs/OCs for QRA:		PPE: Moderate hazard
Other conditions affecting workers exposure		
Place of use:		Indoor
Process temperature (for liquid):		<= 40 °C
Skin surface potentially exposed:		One hand face only (240 cm ²)
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.033 mg/m ³	RCR < 0.01
Inhalation, local, long-term	0.033 mg/m ³	RCR < 0.01
Inhalation, local, acute	0.13 mg/m ³	RCR < 0.01
Dermal, systemic, long-term	0.004 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01
Contributing Scenario (3) controlling professional worker exposure for PROC 2 (TRA Worker v3)		
Name of contributing scenario		2 - Use in closed, continuous process with occasional controlled exposure - respiratory protection (90%)
Product characteristics		
Concentration of substance in mixture:		5-25%
Frequency and duration of use		
Duration of activity:		< 8 hours

Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed continuous process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	1.628 mg/m ³	RCR = 0.127
Inhalation, local, long-term	1.628 mg/m ³	RCR = 0.031
Inhalation, local, acute	6.511 mg/m ³	RCR = 0.122
Dermal, systemic, long-term	0.164 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.134
Contributing Scenario (4) controlling professional worker exposure for PROC 3 (TRA Worker v3)		
Name of contributing scenario	3 - Use in closed batch process	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Closed batch process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	

Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	9.767 mg/m ³	RCR = 0.763
Inhalation, local, long-term	9.767 mg/m ³	RCR = 0.184
Inhalation, local, acute	39.07 mg/m ³	RCR = 0.734
Dermal, systemic, long-term	0.083 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.767
Contributing Scenario (5) controlling professional worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.707
Contributing Scenario (6) controlling professional worker exposure for PROC 9 (TRA Worker v3)		
Name of contributing scenario	9 - Transfer into small containers - LEV (80%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	

Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	6.511 mg/m ³	RCR = 0.509
Inhalation, local, long-term	6.511 mg/m ³	RCR = 0.122
Inhalation, local, acute	26.05 mg/m ³	RCR = 0.49
Dermal, systemic, long-term	0.823 mg/kg bw/day	RCR = 0.036
Combined routes, systemic, long-term		RCR = 0.544
Contributing Scenario (7) controlling professional worker exposure for PROC 15 (TRA Worker v3)		
Name of contributing scenario	15 - Use as laboratory reagent - LEV (80%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal):	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		

Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	One hand face only (240 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	0.041 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.256
Contributing Scenario (8) controlling professional worker exposure for PROC 20 (TRA Worker v3)		
Name of contributing scenario	20 - Heat and pressure transfer fluids in dispersive, professional use but closed system - LEV (80%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	yes [Effectiveness Inhal: 80%]	
Local exhaust ventilation (for dermal)	no [Effectiveness Dermal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	0.205 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR = 0.263

Exposure Scenario 8 (ES8): PW-3: Use by professional worker - Dilution of a concentrate

Free short title	Formulation	
Systematic title based on use descriptor	ERC 8D; PROC 5, 8A, 8B	
Name of contributing environmental scenario and corresponding ERC	ERC 8d - Dilution of a concentrate (professional)	
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 5 - Mixing or blending in batch processes - max. 5% PROC 8a - Transfer at non dedicated facilities - max. 5% - respiratory protection (90%) PROC 8b - Transfer at dedicated facilities - max. 5% PROC 5 - Mixing or blending in batch processes - max. 25% - respiratory protection (90%) PROC 8a - Transfer at non dedicated facilities - max. 25% - respiratory protection (90%) PROC 8b - Transfer at dedicated facilities - max. 25% - respiratory protection (90%)	
Contributing Scenario (1) controlling environmental exposure for ERC 8D		
Operational conditions		
Percentage of tonnage used at regional scale:	10 %	
Daily use at site:	<= 0.001 tonnes/day	
Technical and organizational conditions and measures		
Indoor/Outdoor use:	Covers indoor and outdoor use	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	
Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Freshwater	Local PEC: 0.011 mg/L	RCR = 0.64
Sediment (freshwater)	Local PEC: 0.182 mg/kg dw	RCR = 0.64
Marine water	Local PEC: 0.001 mg/L	RCR = 0.624
Sediment (marine water)	Local PEC: 0.018 mg/kg dw	RCR = 0.624
Predator (freshwater)	Local PEC: 0.401 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.038 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.02 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.08 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.023 mg/kg dw	RCR = 0.498
Predator (terrestrial)	Local PEC: 0.012 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.645E-4 mg/m ³	RCR < 0.01
Man via Environment - Oral	Exposure via food consumption: 0.001	RCR < 0.01

	mg/kg bw/day	
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	3.108E-4 mg/kg bw/day	0.011 mg/L
Fish	0.001 mg/kg bw/day	0.633 mg/kg ww
Leaf crops	2.458E-5 mg/kg bw/day	0.001 mg/kg ww
Root crops	1.215E-4 mg/kg bw/day	0.022 mg/kg ww
Meat	6.562E-8 mg/kg bw/day	1.526E-5 mg/kg ww
Milk	4.869E-8 mg/kg bw/day	6.075E-6 mg/kg ww
Contributing Scenario (2) controlling professional worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	10.85 mg/m ³	RCR = 0.848
Inhalation, local, long-term	10.85 mg/m ³	RCR = 0.204
Inhalation, local, acute	43.41 mg/m ³	RCR = 0.816
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.872
Contributing Scenario (3) controlling professional worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - max. 5% - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		

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Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	2.713 mg/m ³	RCR = 0.212
Inhalation, local, long-term	2.713 mg/m ³	RCR = 0.051
Inhalation, local, acute	10.85 mg/m ³	RCR = 0.204
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.236
Contributing Scenario (4) controlling professional worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - max. 5%	
Product characteristics		
Concentration of substance in mixture:	1-5%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	nos [Effectiveness Inhal: 00%]	
Occupational Health and Safety Management System:	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	No [Effectiveness Inhal: 0%]	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation

Inhalation, systemic, long-term	10.85 mg/m ³	RCR = 0.848
Inhalation, local, long-term	10.85 mg/m ³	RCR = 0.204
Inhalation, local, acute	43.41 mg/m ³	RCR = 0.816
Dermal, systemic, long-term	0.548 mg/kg bw/day	RCR = 0.024
Combined routes, systemic, long-term		RCR = 0.872
Contributing Scenario (5) controlling professional worker exposure for PROC 5 (TRA Worker v3)		
Name of contributing scenario	5 - Mixing or blending in batch processes - max. 25% - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands face (480 cm ²)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m ³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m ³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m ³	RCR = 0.245
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.326
Contributing Scenario (6) controlling professional worker exposure for PROC 8a (TRA Worker v3)		
Name of contributing scenario	8a - Transfer at non dedicated facilities - max. 25% - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	

Containment:	No	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm2)	
Exposure concentrations and risks for workers		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	8.139 mg/m ³	RCR = 0.636
Inhalation, local, long-term	8.139 mg/m ³	RCR = 0.153
Inhalation, local, acute	32.56 mg/m ³	RCR = 0.612
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.707
Contributing Scenario (7) controlling professional worker exposure for PROC 8b (TRA Worker v3)		
Name of contributing scenario	8b - Transfer at dedicated facilities - max. 25% - respiratory protection (90%)	
Product characteristics		
Concentration of substance in mixture:	5-25%	
Frequency and duration of use		
Duration of activity:	< 8 hours	
Technical and organisational conditions and measures		
General ventilation:	Basic general ventilation (1-3 air changes per hour)	
Containment:	Semi-closed process with occasional controlled exposure	
Local exhaust ventilation:	no [Effectiveness Inhal: 0%]	
Occupational Health and Safety Management System:	Basic	
RMMs/OCs for QRA:	General: Moderate hazard	
Conditions and measures related to personal protection, hygiene and health evaluation		
Dermal Protection:	Yes (chemically resistant gloves conforming to EN374) [Effectiveness Dermal: 80%]	
Respiratory Protection:	Yes (Respirator with APF of 10) [Effectiveness Inhal: 90%]	
RMMs/OCs for QRA:	PPE: Moderate hazard	
Other conditions affecting workers exposure		
Place of use:	Indoor	
Process temperature (for liquid):	<= 40 °C	
Skin surface potentially exposed:	Two hands (960 cm2)	
Exposure concentrations and risks for workers		

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Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	3.256 mg/m³	RCR = 0.254
Inhalation, local, long-term	3.256 mg/m³	RCR = 0.061
Inhalation, local, acute	13.02 mg/m³	RCR = 0.245
Dermal, systemic, long-term	1.645 mg/kg bw/day	RCR = 0.072
Combined routes, systemic, long-term		RCR = 0.326

Exposure Scenario 10 (ES10): C-1: Consumer Use - Dilution of a concentrate

Free short title		Formulation
Systematic title based on use descriptor		ERC 8A, 8D; PC 8, 13
Name of contributing environmental scenario and corresponding ERC		ERC 8d, 8a - Dilution of a concentrate (Consumer Use)
Name(s) of contributing consumer scenarios and corresponding PCs		PC 8 - Dilution of a concentrate for use as biocidal product PC 13- Dilution of a concentrate for use in fuels
Contributing Scenario (1) controlling environmental exposure for ERC 8D, 8A		
Operational conditions		
Percentage of tonnage used at regional scale:	10 %	
Daily use at site:	<= 6.9E-4 tonnes/day	
Conditions and measures related to sewage treatment plant (STP)		
Municipal STP	Yes [Effectiveness Water: 88.37%]	
Discharge rate of STP:	>= 2E3 m3/d	
Application of the STP sludge on agricultural soil:	Yes	
Conditions and measures related to treatment of waste (including article waste)		
Particular considerations on the waste treatment operations:	No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other conditions affecting environmental exposure		
Receiving surface water flow rate:	1.8E4 m3/d	
Exposure and risks for the environment and man via the environment		
Exposure concentrations and risks for the environment		
Protection target	Exposure concentration (PEC)	Risk characterisation
Sediment (freshwater)	Local PEC: 0.115 mg/kg dw	RCR = 0.406
Marine water	Local PEC: 6.616E-4 mg/L	RCR = 0.389
Sediment (marine water)	Local PEC: 0.011 mg/kg dw	RCR = 0.389
Predator (freshwater)	Local PEC: 0.285 mg/kg ww	RCR < 0.01
Predator (marine water)	Local PEC: 0.027 mg/kg ww	RCR < 0.01
Top predator (marine water)	Local PEC: 0.017 mg/kg ww	RCR < 0.01
Sewage treatment plant	Local PEC: 0.04 mg/L	RCR < 0.01
Agricultural soil	Local PEC: 0.012 mg/kg dw	RCR = 0.253
Predator (terrestrial)	Local PEC: 0.007 mg/kg ww	RCR < 0.01
Man via Environment - Inhalation	Local PEC: 5.59E-4 mg/m ³	RCR < 0.01
Sediment (freshwater)	Local PEC: 0.115 mg/kg dw	RCR = 0.406
Man via Environment - Oral	Exposure via food consumption: 9.444E-4 mg/kg bw/day	RCR < 0.01
Man via environment - combined routes		RCR < 0.01
Contribution to oral intake for man via the environment from local contribution		
Type of food	Estimated daily dose	Concentration in food
Drinking water	1.97E-4 mg/kg bw/day	0.007 mg/L
Fish	6.595E-4 mg/kg bw/day	0.401 mg/kg ww
Leaf crops	2.428E-5 mg/kg bw/day	0.001 mg/kg ww

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Root crops	6.346E-5 mg/kg bw/day	0.012 mg/kg ww
Meat	4.664E-8 mg/kg bw/day	1.085E-5 mg/kg ww
Milk	3.461E-8 mg/kg bw/day	4.318E-6 mg/kg ww
Contributing Scenario (2) controlling consumer exposure for PC 8		
Name of contributing scenario	8 - Dilution of a concentrate for use as biocidal product	
Product characteristics (External Tool (Consexpo 4.1))		
Concentration of substance in mixture:	0.25 g/g	
Amount used, frequency and duration of use/exposure (External Tool (Consexpo 4.1))		
Exposure frequency:	24 1/year	
Exposure time:	0.022 hr	
Amount of product used per application:	1E3 g/event	
Application duration:	1.33 min	
Amount in contact with skin:	0.02 g	
Measures related to information and behavioural advice to consumers including personal protection and hygiene		
Organisational measures for QRA:	General and PPE: Moderate hazard <i>Only for products containing concentrations of and above 10% (which is the limit for classification of mixtures for the endpoints Skin and Eye Irrit. 2 according to Regulation (EC) No 1272/2008 (CLP)). In case for a respective activity the substance is handled in concentrations below 10% no additional organisational measures have to be applied.</i>	
Other conditions affecting consumers exposure (External Tool (Consexpo 4.1))		
Room volume:	1 m ³	
Air changes per hour (ACH):	0.6 1/h	
Release area: = 20 cm ²	20 cm ²	
Molecular weight matrix:	3E3 g/mol	
Mass transfer coefficient:	0.192 m/min	
Exposure concentrations and risks for consumers (External Tool (Consexpo 4.1))		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.001 mg/m ³	RCR < 0.01
Inhalation, local, long-term	0.001 mg/m ³	RCR < 0.01
Inhalation, local, acute	1.12 mg/m ³	RCR = 0.042
Dermal, systemic, long-term	0.083 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01
Contributing Scenario (3) controlling consumer exposure for PC 13		
Name of contributing scenario	13 - Dilution of a concentrate for use in fuels	
Product characteristics (External Tool (Consexpo 4.1))		
Concentration of substance in mixture:	0.25 g/g	
Amount used, frequency and duration of use/exposure (External Tool (Consexpo 4.1))		
Exposure frequency:	24 1/year	
Exposure time:	0.022 hr	
Amount of product used per application:	1E3 g/event	
Application duration:	1.33 min	
Amount in contact with skin:	0.02 g	

Measures related to information and behavioural advice to consumers including personal protection and hygiene		
Organisational measures for QRA:	General and PPE: Moderate hazard <i>Only for products containing concentrations of and above 10% (which is the limit for classification of mixtures for the endpoints Skin and Eye Irrit. 2 according to Regulation (EC) No 1272/2008 (CLP)). In case for a respective activity the substance is handled in concentrations below 10% no additional organisational measures have to be applied.</i>	
Other conditions affecting consumers exposure (External Tool (Consexpo 4.1))		
Room volume:	1 m ³	
Air changes per hour (ACH):	0.6 1/h	
Release area: = 20 cm ²	20 cm ²	
Molecular weight matrix:	3E3 g/mol	
Mass transfer coefficient:	0.192 m/min	
Exposure concentrations and risks for consumers (External Tool (Consexpo 4.1))		
Route of exposure and type of effects	Exposure concentration	Risk characterisation
Inhalation, systemic, long-term	0.001 mg/m ³	RCR < 0.01
Inhalation, local, long-term	0.001 mg/m ³	RCR < 0.01
Inhalation, local, acute	1.12 mg/m ³	RCR = 0.042
Dermal, systemic, long-term	0.083 mg/kg bw/day	RCR < 0.01
Combined routes, systemic, long-term		RCR < 0.01

END OF SAFETY DATA SHEET