SIBUR-NEFTEKHIM JSC

SAFETY DATA SHEET

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

ETHYLENE GLYCOL
(Premium Grade, First Grade)

Version: 3.1
Date created: 16/01/2020

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

1.1. Product identifier

Product form:	Substance
Substance name:	Ethane-1,2-diol
Chemical name:	Ethane-1,2-diol
EC index No.:	603-027-00-1
EC No.:	203-473-3
CAS-No.:	107-21-1
REACH registration No:	01-2119456816-28-0025
Formula:	$C_2H_6O_2$
Synonyms:	1,2-ethanediol, ethylene glycol
Trade names:	Ethanediol, MEG, Ethylene glycol (Pemium Grade, First Grade)

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:	Use as Intermediate Use as Process chemical Distribution of substance Formulation & (re)packing of substance and mixtures Production of Polymers Use in Paints/Coatings (industrial) Use in Paints/Coatings/Adhesives/ Sealants/ Foams/ Polymers/ filled Polymers (professional) Use in Paints/Coatings /Surface treatment products (Consumer use) Use in Cleaning agents (industrial) Use in Cleaning agents (professional) Use in Cleaning agents (Consumer use) Use in Lubricants (industrial) Use in Metal-working fluids (industrial) Use in metal-working fluids (professional) Use in Agrochemicals (professional) Use in/as Functional fluids (industrial) Use in/as Functional fluids (professional) Use in Heat transfer and Hydraulic fluids (Consumer use) Use in/as De-icing/Anti-icing applications/agents (professional) Use in/as De-icing/Anti-icing applications/agents (Consumer use) Use in laboratories (industrial) Use in laboratories (professional) Use in Water-treatment chemicals (industrial) Use in Adhesives and Sealants (Consumer use)

	Production of Polymers, filled polymers, Foams, Coatings, Adhesives, Sealants Production of rigid foam (Consumer use) Use in Biocidal products (Consumer use) Use in Water-treatment chemicals (professional) Use as Oilfield Chemicals *For the detailed identified uses of the product see Annex.*
Most common technical function of substance:	Anti-freezing agents Intermediates Heat transfer agents Laboratory chemicals

1.2.2. Uses advised against

Restrictions on use:	PC 29: Pharmaceuticals 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-Elysées, 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-NEFTEKHIM JSC
Address:	Building 390, Eastern Industrial Zone, Dzerzhinsk, Nizhniy Novgorod region, 606000, Russian Federation
Contact phone:	+7 8313 27-59-09
Fax:	+7 8313 27-59-99
Email Address:	infosnh@snh.sibur.ru, techservice@sibur.ru
Emergency Telephone:	+7 8313 27-52-98 (office hours only, GMT+3)
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]

Acute Tox. 4	H302
STOT Rep. Exp. 2	H373

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

GHS08

Signal word (CLP): Warning

Hazard statements (CLP):	H302: Harmful if swallowed. H373: May cause damage to organs <or state all organs affected, if known> through prolonged or repeated exposure <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>). Affected organs: kidney
Precautionary statements (CLP):	P260 Do not breathe dust/fume/gas/mist/vapours/spray. P264 Wash with plenty of water and soap thoroughly after handling. P270 Do not eat, drink or smoke when using this product P301 + P312 IF SWALLOWED: Call a POISON CENTRE/doctor/…if you feel unwell. … P501 Dispose of contents/container to hazardous or special waste collection point
EUH-statements:	Not applicable.

2.3. Other hazards

Other hazards not contributing to the classification:	Not available.
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 bioaccummulative) criteria.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Name	Product identifier	%	Classification [CLP]
Ethane-1,2-diol	(CAS-No.) 107-21-1 (EC No.) 203-473-3 (EC index No.) 603-027-00-1 (REACH-no) 01-2119456816-28-0025	>98.5%	H302, H373

The product does not contain impurities or additives that could affect product's labelling and classification according to Regulation (EC) No 67/548/EEC and Regulation (EC) No 1272/2008 (CLP).

3.2. Mixtures

Not applicable

SECTION 4. FIRST-AID MEASURES

4.1. Description of first aid measures

Product-specific hazards and other issues

The product is harmful if swallowed. Symptoms of poisoning may occur even after several hours; therefore medical observation is suggested for at least 48 hours after the accident.

First-aid measures general

Remove contaminated clothing.

First-aid measures after inhalation

Keep patient calm, remove to fresh air, seek medical attention.

In case of adverse exposure to vapours and/or aerosols formed at elevated temperatures, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest.

First-aid measures after skin contact

Wash thoroughly with soap and water.

First-aid measures after eye contact

Wash affected eyes for at least 15 minutes under running water with eyelids held open.

First-aid measures after ingestion

Immediately rinse mouth and then drink 200-300 ml of water. Seek immediate medical attention. Do not induce vomiting or give anything by mouth to a groggy or unconscious person.

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

Symptoms/effects:	Symptoms: kidney damage
Symptoms/effects after inhalation:	Headache, dizziness, weakness, cough.
Symptoms/effects after skin contact:	Redness, edema
Symptoms/effects after eye contact:	Lacrimation, pain
Symptoms/effects after ingestion:	Headache, dizziness, weakness, vomiting, nausea, diarrhea. In case of severe poisoning: fainting, convulsions.

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

Advice to physician

Treatment: 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, dry powder, alcohol-resistant foam, carbon dioxide
Unsuitable extinguishing media	No information available.

5.2. Special hazards arising from the substance or mixture

Fire hazard:	The product is combustible.
Explosion hazard:	No information available.
Hazardous decomposition products in case of fire:	During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

5.3. Advice for fire-fighters

Firefighting instructions:	Do not release chemically contaminated water into drains, soil or surface water. Sufficient measures must be taken to retain the water used for extinguishing. Dispose of contaminated water and soil according to local regulations.
Protection during firefighting:	Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves).
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	Evacuate non-essential personnel. Do not touch or walk through spilled material.

6.1.2. For emergency responders

Emergency procedures	Wear appropriate personal protective equipment . Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Ventilate area of leak or spill. Remove all sources of ignition. Stop leak if you can do so without risk. Avoid contact with spilled or released material.

6.2. Environmental precautions

Prevent from entering into soil, ditches, sewers, waterways and/or groundwater.
Do not empty into drains.

6.3. Methods and material for containment and cleaning up

Contain spilled material if possible and dispose of properly.
Collect in suitable and properly labeled containers.
For small amounts: Pick up with suitable absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr). Dispose of absorbed material in accordance with regulations.
For large amounts: Pump off product. Correctly dispose of recovered product immediately.

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	Protection against fire and explosion: Take precautionary measures against static discharges. Electrical devices must meet the specified temperature class. Temperature class: T2 (Autoignition temperature >300 °C). Avoid breathing of or contact with material. Only use in well ventilated areas.
Hygiene measures	Take off contaminated clothing and wash before reuse. Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

7.2. Conditions for safe storage, including any incompatibilities

Incompatible materials	Oxidizing agents, acids, alkalis.
Storage area	Keep container tightly closed and dry; store in a cool place. Store away from sunlight, ignition sources and other sources of heat. Protect from air. Protect from atmospheric humidity. Storage temperature: < 40 °C. The stated storage temperature should be noted. Storage duration: 12 Months
Packaging materials	High density polyethylene (HDPE), High-Purity Polymer, Stainless steel

7.3. Specific end use(s)

Not applicable.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

8.1.1. Occupational Exposure Limits

Ethane-1,2-diol (CAS 107-21-1), vapour

	LTEL TWA ppm	LTEL TWA mg/m^3	STEL ppm	STEL mg/m^3	Note
European Union	20	52	40	104	
Austria	10	26	20	52	
Denmark	10	26	20	52	
France	20	52	40	104	
Germany (AGS)	10	26	20	52	
Germany (DFG)	10	26	20	52	
Italy	20	52	40	104	
Poland		15		50	
Sweden	10	25	20	50	
Switzerland	10	26	20	52	

The Netherlands		52		104	
United Kingdom	20	52	40	104	
Ethane-1,2-diol (CAS 107-21-1),					
	LTEL TWA ppm	**LTEL TWA mg/m³**	**STEL ppm**	**STEL mg/m³**	**Note**
Finland	20	50	40	100	
Sweden	10	25	40	104	
Ethane-1,2-diol (CAS 107-21-1), particulate					
	LTEL TWA ppm	**LTEL TWA mg/m³**	**STEL ppm**	**STEL mg/m³**	**Note**
Belgium	20	52	40	104	
Denmark		10		20	
Germany (AGS)	10	26	20	52	
Germany (DFG)	10	26	20	52	
Hungary		52		104	
Ireland		10			
Latvia	20	52	40	104	
Poland		15		50	
Spain	20	52	40	104	
Sweden	10	25	20 (1)	50 (1)	
Switzerland	10	26	20	52	
The Netherlands		10			
United Kingdom		10			

8.1.2. DNEL/ PNEC values

Ethane-1,2-diol (CAS 107-21-1)	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	No hazard identified
Acute - local effects, dermal	No hazard identified
Acute - local effects, inhalation	No hazard identified
Long-term - systemic effects, dermal	106 mg/kg bw/day
Long-term - systemic effects, inhalation	No hazard identified
Long-term - local effects, dermal	No hazard identified
Long-term - local effects, inhalation	35 mg/m³
DNEL/DMEL (General population)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	No hazard identified
Acute - systemic effects, oral	No hazard identified
Acute - local effects, dermal	No hazard identified
Acute - local effects, inhalation	No hazard identified
Long-term - systemic effects, dermal	53 mg/kg bw/day
Long-term - systemic effects, inhalation	No hazard identified
Long-term - systemic effects,oral	No hazard identified
Long-term - local effects, dermal	No hazard identified
Long-term - local effects, inhalation	7 mg/m³
Eyes, local effects	No hazard identified

PNEC (water)	
PNEC aqua (freshwater)	10 mg/L
PNEC aqua (marine water)	1 mg/L
PNEC aqua (intermittent, freshwater)	10 mg/L
PNEC (Sediment)	
PNEC sediment (freshwater)	37 mg/kg sediment dw
PNEC sediment (marine water)	3.7 mg/kg sediment dw
PNEC (Soil)	
PNEC soil	1.53 mg/kg soil dw
PNEC (Oral)	
PNEC oral (secondary poisoning)	As the substance is not considered bioaccumulative, secondary poisoning is not a relevant exposure route.
PNEC (STP)	
PNEC sewage treatment plant	199.5mg/L

8.2. Exposure controls

Appropriate engineering controls:

Ventilation System: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.

Hand protection:

Not normally required.

If contact with the product is possible:

Full contact: glove material: Nitrile rubber; glove thickness: 0,11 mm; break through time: > 480 min. Splash contact: glove material: Nitrile rubber; glove thickness: 1,11 mm; break through time: > 480 min.

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the resultant standard EN 374, e.g. KCL 741 Dermatril (R) L (full contact), KCL 741 Dermatril (R) L (splash contact). The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN 374 with samples of the recommended glove types.

Eye protection:

Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

Skin and body protection:

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Respiratory protection:

Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed use full protective clothing and self-contained breathing apparatus with full facepiece (JIS T8155) operated in the pressure demand or other positive pressure mode.

Environmental exposure controls:

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Exhaust emission systems should be designed in accordance with local conditions; the air should always be moved away from the source of vapour generation and the person working at this point. Eye washes and showers for emergency use. Firewater monitors and deluge systems are recommended. Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

Other information:
Wash at the end of each work shift and before eating, drinking, smoking or using the toilet.
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 Form: Syrupy Colour: clear, colourless Odour: odourless
Melting / freezing point	-13 °C at 101.3 kPa
Boiling point	197.4 °C at 1013 hPa
Relative density	1.11 g/cm^3 at 20 °C
Vapour pressure	0.123 hPa at 25 °C
Surface tension	Not surface active
Water solubility	Miscible in all proportions
Partition coefficient n-octanol/water (log value)	-1.36 at 25 °C
Flash point	111 °C at 1013 hPa
Flammability	Non flammable upon ignition. The substance has no pyrophoric properties and does not liberate flammable gases on contact with water.
Explosive properties	Non explosive
Self-ignition temperature	398 °C at 1013 hPa
Oxidising properties	No oxidising properties
Viscosity	Not applicable
Granulometry	Not applicable
Stability in organic solvents and identity of relevant degradation products	Not applicable The stability of the substance is not considered as critical, thus no study is conducted.
Dissociation constant	16.1 mPas at 25 °C

9.2. Other information

Not available.

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

Stable under normal temperatures and pressures. Hygroscopic (absorbs moisture from the air).

10.2. Chemical stability

Stable under normal conditions of use. Product will not become self-reactive.

10.3. Possibility of hazardous reactions

Hazardous, exothermical polymerization cannot occur.

10.4. Conditions to avoid

Heat, flames, ignition sources, water (absorbs readily) and incompatibles.

10.5. Incompatible materials

Strong oxidizing agents, strong acids, strong bases, isocyanates, aliphatic amines.

10.6. Hazardous decomposition products

Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute toxicity

Ethane-1,2-diol (CAS 107-21-1)	
LD50, oral, rats	7712 mg/kg bw
LC50, inhalation, rats	2500 mg/m³ (LC50 value derived from teratogenicity study)
LD50, dermal, mouse	>3500 mg/kg bw (LD50 derived from developmental toxicity study)
Note	Acute toxicity after oral administration

Skin corrosion/irritation	No adverse effect observed (not irritating).
Additional information	No skin irritation using rabbits, when given the unchanged test substance under occlusive conditions for 20 hours.
Serious eye damage/irritation	No adverse effect observed (not irritating).
Additional information	No eye irritation effects after 1 and 24 hours after applying the substance into the eyes of rabbits.
Respiratory or skin sensitisation	Not sensitizing.
Additional information	Since there is no structural alert, no testing is necessary. In some orientating studies with animals and humans no sensitizing properties were found.
Germ cell mutagenicity	No adverse effect observed (negative).
Additional information	A test for bacterial gene mutagenicity was conducted with monoethylene glycol according to the OECD TG 471 under GLP conditions. Monoethylene glycol was not mutagenic in the bacterial reverse mutation test in the absence and the presence of metabolic activation.
Carcinogenicity	Substance is not considered to be classified as carcinogen under Regulation (EC) No 1272/2008

Ethane-1,2-diol (CAS 107-21-1)	
NOAEL, oral, rats	1 000 mg/kg diet (Exposure: 24 months (daily))
NOAEL, oral, mice	1 500 mg/kg bw/day (Duration of treatment / exposure: 103 weeks)

Toxicity for reproduction	The substance is not classified in the EU as a reproductive toxicant.

Ethane-1,2-diol (CAS 107-21-1)	
NOAEL, oral, rat (fertility)	> 1000 mg/kg bw/d (three-generation reproduction toxicity study)
NOAEC, inhalation: aerosol (whole body), rat (developmental toxicity)	1000 mg/m³ air
NOAEC, inhalation: aerosol, mouse (developmental toxicity)	150 mg/m³ air

STOT-single exposure	Conclusive but not sufficient for classification
Repeated dose toxicity	The substance is considered to be classified and labelled with STOT RE Cat. 2, H373 (May cause damage to organs) for repeated dose toxicity (oral route) under Regulation (EC) No 1272/2008. Classification concerning repeated dermal and repeated inhalation toxicity is not warranted.

Ethane-1,2-diol (CAS 107-21-1)	
NOAEL, oral, rat	150 mg/kg bw/day (equivalent or similar to OECD Guideline 452) The kidneys were found to be the target organ at higher doses.
NOAEL, dermal, dog	2200 mg/kg bw/day (OECD Guideline 410)
Aspiration hazard	Not applicable.
Other effects:	Neurotoxicity: CNS effects are known in humans only at near-lethal doses. In a large data base of animal studies, no neurotoxic/CNS effects have been observed. Immunotoxicity: Not available.

SECTION 12. ECOLOGICAL INFORMATION

12.1. Toxicity

Ethane-1,2-diol (CAS 107-21-1)	
Fish (Short-term toxicity)	
LC50 (96h)	>72860 mg/L - Pimephales promelas (EPA 600/4-90/027)
Fish (Long-term toxicity)	
LC50 (28 d)	> 1 500 mg/L - Tidewater silverside (Read-across)
NOEC (7d)	15 380 mg/L - Pimephales promelas (EPA 600/4-89/001)
Aquatic invertebrates (Short-term toxicity)	
EC50 (48 h)	>100 mg/L - Daphnia magna (OECD Guideline 202)
EC100 (48 h)	>100 mg/L- Daphnia magna (OECD Guideline 202)
Aquatic invertebrates (Long-term toxicity)	
NOEC (7 d)	8590 mg/L - Ceriodaphnia dubia (EPA 600/4-89/001)
NOEC (21 d):	7500 - 15000 mg/L - Daphnia magna (ASTM Subcommittee E 47.01, Draft No. 1)
Algae and aquatic plants	
NOEC (72 h)	> 100 mg/L - Scenedesmus quadricauda (Read-across)
EC50 (96 h)	6500 - 13000 mg/L - Pseudokirchneriella subcapitata (based on: growth rate)(EPA 600/9-78-018, 1978)
Toxicity to aquatic micro-organisms	
EC20 (30 min)	> 1 995 mg/L - Activated sludge, domestic (ISO 8192)

12.2. Persistence and degradability

Abiotic degradation:	After evaporation or exposure to the air, the product will be slowly degraded by photochemical processes. No data on hydrolysis are available. However, glycols are generally regarded as stable towards hydrolysis
Biodegradation	Readily biodegradable (according to OECD criteria). After 10 days > 90 % degradation of ethylene glycol was determined. (OECD 301A)
Persistence and degradability	- Not P / vP based on ready biodegradability: The substance is readily biodegradable according to OECD criteria. T1/2<=60 days in marine water. T1/2<=40 days in fresh- or estuarine water T1/2<=180 days in marine sediment T1/2<=120 days in fresh- or estuarine sediment T1/2<=120 days in soil

12.3. Bioaccumulative potential

Aquatic bioaccumulation:	There are no studies on the bioaccumulation potential – neither in aquatic nor in terrestrial organisms – available. Based on an calculated logPow of -1.36, accumulation in organisms is not to be expected.

Secondary poisoning:	Based on the available information, there is no indication of a bioaccumulation potential and, hence, secondary poisoning is not considered relevant

12.4. Mobility in soil

Biodegradation in soil:	Study scientifically unjustified (substance is readily biodegradable)

12.5. 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 fulfil the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).

12.6. Other adverse effects

Not available.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste disposal recommendations	Material Disposal: Recover or recycle if possible. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Remove all packaging for recovery or waste disposal. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water. Container Disposal: Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations.
European List of Waste (LoW) code	Not applicable

SECTION 14. TRANSPORT INFORMATION

14.1. Land transport (ADR/ RID)

Not regulated.

14.2. Inland waterway transport (ADN)

Not regulated.

14.3. Sea transport (IMDG)

Not regulated.

14.4. Air transport (IATA/ICAO)

Not regulated.

14.5. Special precautions for user

Always transport in closed containers. Ensure that persons transporting the product know what to do in the event of an accident or spillage. For information regarding Exposure Controls/Personal Protection see Section 8 of the SDS.

14.6. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable.

SECTION 15. REGULATORY INFORMATION

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

15.1.1. EU-Regulations

Authorisations and/or restrictions on use (Annex XVII): Not applicable.
Ethane-1,2-diol (CAS 107-21-1) is not on the REACH Candidate List.

Ethane-1,2-diol (CAS 107-21-1) is not on the REACH Annex XIV List.

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

No information available.

15.2. Chemical safety assessment

Chemical Safety Report has been performed for *Ethane-1,2-diol (CAS 107-21-1)*.

SECTION 16. OTHER INFORMATION

16.1. Indication of changes

Version	Date of change	Section	Description of changes
2.1	08/02/2011	1-16, Annex I, II	DATE CREATED
3.0	04/04/2018	1-16, Annex	SDS has been corrected in according to new contact information, data of Registration dossier and Chemical Safety Report
3.1	16/01/2020	Title, 1, 3.1	Information on Grades of MEG was added.

16.2. Abbreviations and acronyms

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
AGS	The German Committee on Hazardous Substances (Ausschuss für Gefahrstoffe – AGS)
BCF	Bioconcentration factor
DFG	Germany Research Foundation
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
Kow	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)
LOAEC	Lowest Observable Adverse Effect Concentration
LTEL	Long Term Exposure Limit
NIOSH	National Institute for Occupational Safety and Health *(USA CDC)*
NOEC	No Observed Effect Concentration
NOAEL	No Observed Adverse Effect Level
OECD	Organization for Economic Co-operation and Development
OSHA	Occupational Safety & Health Administration *(USA)*

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
SCOEL	Scientific Committee on Occupational Exposure Limits
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
WGK	Wassergefährdungsklasse *(German: Water Hazard Class)*

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

H302	Acute Tox. 4	H302: Harmful if swallowed.
H373	STOT RE 2	H373:May cause damage to organs <or state all organs affected, if known> through prolonged or repeated exposure <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. Affected organs: kidneys.

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

ES1	Use as Intermediate pp.17-20
ES2	Use as Process chemical pp.21-25
ES3	Distribution of substance pp.26-20
ES4	Formulation & (re)packing of substance and mixtures pp.30-34
ES5	Production of Polymers pp.35-38
ES6	Use in Paints/Coatings (industrial) pp.39-44
ES7	Use in Paints/Coatings/Adhesives/ Sealants/ Foams/ Polymers/ filled Polymers (professional) pp.45-51
ES8	Use in Paints/Coatings /Surface treatment products (Consumer use) pp. 52-64
ES9	Use in Cleaning agents (industrial) pp.65-69
ES10	Use in Cleaning agents (professional) pp.70-74
ES11	Use in Cleaning agents (Consumer use) pp.75-80
ES12	Use in Lubricants (industrial) pp.81-86
ES13	Use in Metal-working fluids (industrial) pp.87-92
ES14	Use in metal-working fluids (professional) pp.93-98
ES15	Use in Agrochemicals (professional) pp.99-103
ES16	Use in/as Functional fluids (industrial) pp.104-106
ES17	Use in/as Functional fluids (professional) pp.107-109
ES18	Use in Heat transfer and Hydraulic fluids (Consumer use) pp.110-111
ES19	Use in/as De-icing/Anti-icing applications/agents (professional) pp.112-115
ES20	Use in/as De-icing/Anti-icing applications/agents (Consumer use) pp.116-117
ES21	Use in laboratories (industrial) p.118
ES22	Use in laboratories (professional) p.119
ES23	Use in Water-treatment chemicals (industrial) p.120-122
ES24	Use in Adhesives and Sealants (Consumer use) pp.123-125
ES25	Production of Polymers, filled polymers, Foams, Coatings, Adhesives, Sealants pp. 126-132
ES26	Production of rigid foam (Consumer use) pp.133
ES27	Use in Biocidal products (Consumer use) p. 134-135

ES28	Use in Water-treatment chemicals (professional) pp.136-138
ES29	Use as Oilfield Chemicals pp.139-140

16.5. Key literature references and sources

DOCUMENTS, PROVIDED BY CONSORTIUM:

CHEMICAL SAFETY REPORT to ***Ethane-1,2-diol (CAS 107-21-1)***.

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).

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): Use as Intermediate

Free short title	Use as Intermediate (2)
Systematic title based on use descriptor	ERC 6A; PROC 1, 2, 3, 4, 5, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6a Industrial use of intermediates
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6A	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure

Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)

Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent
Product characteristics	
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 2 (ES2): Use as Process chemical

Free short title	Use as Process chemical (3)
Systematic title based on use descriptor	ERC 4; PROC 1, 2, 3, 4, 5, 8A, 8B, 9, 13, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 4 Industrial use of processing aids
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 13 - Treatment of articles by dipping and pouring PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 4	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure

Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 5	

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 3 (ES3): Distribution of substance

Free short title	Distribution of substance (4)
Systematic title based on use descriptor	ERC 1, 2, 3, 4, 5, 6A, 6B, 6C, 6D, 7; PROC 1, 2, 3, 4, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 1 Production of chemicals ERC 2 Formulation of preparations ERC 3 Formulation in articles ERC 4 Industrial use of processing aids ERC 5 Industrial use resulting in inclusion into or onto a matrix ERC 6a Industrial use of intermediates ERC 6b Industrial use of reactive processing aids ERC 6c Production of plastics ERC 6d Production of resins/rubbers ERC 7 Industrial use of substances in closed systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 1	
Contributing Scenario (2) controlling environmental exposure for ERC 2	
Contributing Scenario (3) controlling environmental exposure for ERC 3	
Contributing Scenario (4) controlling environmental exposure for ERC 4	
Contributing Scenario (5) controlling environmental exposure for ERC 5	
Contributing Scenario (6) controlling environmental exposure for ERC 6A	
Contributing Scenario (7) controlling environmental exposure for ERC 6B	
Contributing Scenario (8) controlling environmental exposure for ERC 6C	
Contributing Scenario (9) controlling environmental exposure for ERC 6D	
Contributing Scenario (10) controlling environmental exposure for ERC 7	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (11) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	

Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (15) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (16) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Contributing Scenario (17) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (18) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 4 (ES4): Formulation & (re)packing of substance and mixtures

Free short title	Formulation & (re)packing of substance and mixtures (5)
Systematic title based on use descriptor	ERC 2; PROC 1, 2, 3, 4, 5, 8A, 8B, 9, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 2	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	

Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)

Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 5 (ES5): Production of Polymers

Free short title	Production of Polymers (6)
Systematic title based on use descriptor	ERC 6C; PROC 1, 2, 3, 4, 5, 6, 8A, 8B, 9, 15
Name of contributing environmental scenario and corresponding ERC	ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 6 - Calendering operations PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 6C	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 6	
Name of contributing scenario	6 - Calendering operations
Scenario subtitle	Calendering operations
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 6 (ES6): Use in Paints/Coatings (industrial)

Free short title	Use in Paints/Coatings (industrial) (7)
Systematic title based on use descriptor	ERC 4; PROC 1, 2, 3, 4, 5, 7, 8A, 8B, 10, 13, 15
Name of contributing environmental scenario and corresponding ERC	ERC 4 Industrial use of processing aids
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 7 - Industrial spraying PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 4	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)

Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the “Exposure loading per shift body” was added with the 75th percentile of the “Exposure loading per shift hand”. The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: “Spraying” Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.6 l/min Duration of exposure: 6 hours/day Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Ensure that worker is > 1 m from the source Local exhaust ventilation (Direction of airflow away from the worker): yes (effectiveness: ca. 50%) Use of suitable gloves with basic training: Yes (Effectiveness: 90%)

	Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results: The predicted 75th percentile full-shift exposure is 6.6 mg/m³. The inter-quartile confidence interval is 3.4 mg/m³ to 13 mg/m³. Emission sources: Far field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Moderate application rate (0.3 - 3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: LEV systems (50.00 % reduction) Secondary localized controls: No (0 % reduction) Segregation: No segregation (0 % reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: Yes Process fully enclosed: No Room size: 1000 m³ Work area: Indoors Duration (mins): 360 Nonexposure period (mins): 120 Ventilation rate: 3 air changes per hour (ACH) Respiratory protection required: No
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 7 (ES7): Use in Paints/Coatings/Adhesives/ Sealants/ Foams/ Polymers/ filled Polymers (professional)

Free short title	Use in Paints/Coatings/Adhesives/ Sealants/ Foams/ Polymers/ filled Polymers (professional) (8)
Systematic title based on use descriptor	ERC 8A, 8C, 8D, 8F; PROC 1, 2, 3, 4, 5, 8A, 8B, 9, 10, 11, 13, 14, 15, 19
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8c Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8d Wide dispersive outdoor use of processing aids in open systems ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 10 - Roller application or brushing PROC 11 - Non industrial spraying PROC 13 - Treatment of articles by dipping and pouring PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories PROC 19 - Hand-mixing with intimate contact (only PPE available
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
Contributing Scenario (2) controlling environmental exposure for ERC 8C	
Contributing Scenario (3) controlling environmental exposure for ERC 8D	
Contributing Scenario (4) controlling environmental exposure for ERC 8F	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (5) controlling professional worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling professional worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling professional worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling professional worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling professional worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant con-tact)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling professional worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (12) controlling professional worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (14) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Non industrial spraying

Qualitative Risk Assessment	
General	In case no respiratory protection is used: Use a local exhast ventilation with adequate effectiveness.
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	90 %
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: "Spraying" Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.05 l/min Duration of exposure: 150 mins Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Worker is within one meter of the source Direction of airflow: Not clearly away from the worker Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results (before RPE): The predicted 75th percentile full-shift exposure is 35 mg/m^3. The inter-quartile confidence interval is 18 mg/m^3 to 69 mg/m^3. Use of respiratory protection (90% reduction): upper-end inter-quartile confidence interval is 6.9 mg/m^3. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Low application rate (0.03 – 0.3 l/minute) Spray direction: Only horizontal or downward

	Spray technique: Spraying with high compressed air use Primary localized controls: No (0% reduction) Secondary localized controls: No (0 % reduction) Effective housekeeping practices in place: No General housekeeping in place: Yes Process fully enclosed: No Room size: 100 m^3 Work area: Indoors Duration (mins): 150 Nonexposure period (mins): 330 Ventilation rate: Mechanical ventilation giving at least 1 ACH Use of respiratory protection (90% reduction): yes
Contributing Scenario (15) controlling professional worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (16) controlling professional worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (17) controlling professional worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent.
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (18) controlling professional worker exposure for PROC 19	
Name of contributing scenario	19 - Hand-mixing with intimate contact (only PPE available
Scenario subtitle	Hand-mixing with intimate contact and only PPE available
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 8 (ES8): Use in Paints/Coatings /Surface treatment products (Consumer use)

Free short title	Use in Paints/Coatings /Surface treatment products (Consumer use) (9)
Systematic title based on use descriptor	ERC 8A, 8C, 8D, 8F; PC 9a, 15, 18, 23, 31, 34
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8c Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8d Wide dispersive outdoor use of processing aids in open systems ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 9a Coatings and Paints, thinners, paint removers PC 15 Non-metal-surface treatment products PC 9a Coatings and Paints, thinners, paint removers PC 15 Non-metal-surface treatment products PC 18 Ink and Toners PC 18 Ink and Toners PC 23 Leather tanning, dye, finishing, impregnation and care products PC 23 Leather tanning, dye, finishing, impregnation and care products PC 31 Polishes and Wax Blends PC 34 Textile dyes, finishing and impregnating products PC 34 Textile dyes, finishing and impregnating products PC 34 Textile dyes, finishing and impregnating products PC 34 Textile dyes, finishing and impregnating products PC 34 Textile dyes, finishing and impregnating products PC 34 Textile dyes, finishing and impregnating products PC 34 Textile dyes, finishing and impregnating products PC 34 Textile dyes, finishing and impregnating products
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
Contributing Scenario (2) controlling environmental exposure for ERC 8C	
Contributing Scenario (3) controlling environmental exposure for ERC 8D	
Contributing Scenario (4) controlling environmental exposure for ERC 8F	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Contributing Scenario (5) controlling consumer exposure for PC 9a	
Name of contributing scenario	PC 9a Coatings and Paints, thinners, paint removers
Scenario subtitle	Use in Paints/Coatings - non-spraying products
Calculation model	ConsExpo
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	132 min
Application duration	120 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Release duration	7,200 sec
Product characteristics	
Spray application	no
Product ingredient fraction by weight	5 %
Mol weight matrix	45 g/mol

Mass transfer rate	0.331 m/min
Amounts used	
Inhalation	1,250 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Contact rate	30 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	20 m^3
Ventilation rate	0.600 1/h
Release area increases over time	
Release area	1.00E5 cm^2
Release temperature	25 °C
Dermal	
Protective gloves	0 %
Uptake fraction	100 %
Contributing Scenario (6) controlling consumer exposure for PC 15	
Name of contributing scenario	PC 15 Non-metal-surface treatment products
Scenario subtitle	Use in Paints/Coatings - non-spraying products
Calculation model	ConsExpo
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	132 min
Application duration	120 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Release duration	7,200 sec
Product characteristics	
Spray application	no
Product ingredient fraction by weight	5 %
Mol weight matrix	45 g/mol
Mass transfer rate	0.331 m/min
Amounts used	
Inhalation	1,250 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Contact rate	30 mg/min
Other given operational conditions affecting consumers exposure	

Inhalation	
Room volume	20 m^3
Ventilation rate	0.600 1/h
Release area increases over time	
Release area	1.00E5 cm^2
Release temperature	25 °C
Dermal	
Protective gloves	0 %
Uptake fraction	100 %
Contributing Scenario (7) controlling consumer exposure for PC 9a	
Name of contributing scenario	PC 9a Coatings and Paints, thinners, paint removers
Scenario subtitle	Use in Paints/Coatings - spraying products
Calculation model	ConsExpo spray can - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Weight fraction non-valotile	30 %
Max. diameter	100 µm
Spray duration	900 sec
Exposure duration	20 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Release duration	900 sec
Product characteristics	
Spray application	yes
Product ingredient fraction by weight	5 %
Amounts used	
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Contact rate	100 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	34 m^3
Ventilation rate	1.5 1/h
Room height	2.25 m
Mass generation rate	0.330 g/s
Airborne fraction	100 %
Density non-volatile	1.5 %

Droplet distribution	LogNormal, median: 30 µm, coeff. of variation: 0.800 µm, cut-off diameter: 15 µm
Dermal	
Uptake fraction	100 %
Contributing Scenario (8) controlling consumer exposure for PC 15	
Name of contributing scenario	PC 15 Non-metal-surface treatment products
Scenario subtitle	Use in Paints/Coatings - spraying products
Calculation model	ConsExpo spray can - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Weight fraction non-valotile	30 %
Max. diameter	100 µm
Spray duration	900 sec
Exposure duration	20 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Release duration	900 sec
Product characteristics	
Spray application	yes
Product ingredient fraction by weight	5 %
Amounts used	
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Contact rate	100 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	34 m^3
Ventilation rate	1.5 1/h
Room height	2.25 m
Mass generation rate	0.330 g/s
Airborne fraction	100 %
Density non-volatile	1.5 %
Droplet distribution	LogNormal, median: 30 µm, coeff. of variation: 0.800 µm, cut-off diameter: 15 µm
Dermal	
Uptake fraction	100 %
Contributing Scenario (9) controlling consumer exposure for PC 18	
Name of contributing scenario	PC 18 Ink and Toners

Scenario subtitle	Use in Printing inks- Part A. Refilling of toners (cartridges)
Calculation model	ConsExpo Liquid cleaner - Mixing & Loading
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	0.750 min
Application duration	0.300 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	5 %
Mol weight matrix	22 g/mol
Mass transfer rate	0.331 m/min
Amounts used	
Inhalation	50 g
Dermal	0.010 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	1 m^3
Ventilation rate	0.500 1/h
Release are is constant	
Release area	20 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (10) controlling consumer exposure for PC 18	
Name of contributing scenario	PC 18 Ink and Toners
Scenario subtitle	Use in Printing inks- Part B. Printing process
Calculation model	ConsExpo Liquid cleaner - Mixing & Loading
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Dermal	
Exposure calculation result type	Internal dose chronic

Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	5 %
Amounts used	
Inhalation	16 g
Dermal	0.010 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	25 m^3
Ventilation rate	0.600 1/h
Dermal	
Uptake fraction	100 %
Contributing Scenario (11) controlling consumer exposure for PC 23	
Name of contributing scenario	PC 23 Leather tanning, dye, finishing, impregnation and care products
Scenario subtitle	Leather tanning, dye, finishing, impregnation and care products – Use in leather furniture sprays
Calculation model	ConsExpo Furniture leather spray - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per year
Weight fraction non-valotile	10 %
Max. diameter	100 µm
Spray duration	180 sec
Exposure duration	240 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per year
Release duration	180 sec
Product characteristics	
Spray application	yes
Product ingredient fraction by weight	10 %
Amounts used	
Human factors not influenced by risk management	
Exposed skin surface (dermal)	430 cm^2
Contact rate	100 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	

Room volume	58 m^3
Ventilation rate	0.500 1/h
Room height	2.5 m
Mass generation rate	0.600 g/s
Airborne fraction	30 %
Density non-volatile	1.8 %
Droplet distribution	LogNormal, median: 25 µm, coeff. of variation: 0.400 µm, cut-off diameter: 15 µm
Dermal	
Uptake fraction	100 %
Contributing Scenario (12) controlling consumer exposure for PC 23	
Name of contributing scenario	PC 23 Leather tanning, dye, finishing, impregnation and care products
Scenario subtitle	Leather tanning, dye, finishing, impregnation and care products – Shoe cream
Calculation model	ConsExpo Shoe cream - Application
Frequency and duration of use	
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	26 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	50 %
Amounts used	
Dermal	0.100 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Dermal	
Uptake fraction	100 %
Contributing Scenario (13) controlling consumer exposure for PC 31	
Name of contributing scenario	PC 31 Polishes and Wax Blends
Scenario subtitle	Use in surface treatment products – non-spraying products
Calculation model	ConsExpo Furniture polish - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	240 min
Application duration	90 min
Dermal	
Exposure calculation result type	Internal dose chronic

Frequency of use	1 per day
Release duration	7,200 sec
Product characteristics	
Spray application	no
Product ingredient fraction by weight	2.5 %
Mol weight matrix	272 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	550 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	430 cm^2
Contact rate	30 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	58 m^3
Ventilation rate	0.500 1/h
Release area increases over time	
Release area	2.20E5 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (14) controlling consumer exposure for PC 34	
Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products
Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - powder - Machine wash - Part A;
Calculation model	ConsExpo Detergent powder - Loading
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	20 %
Amounts used	
Inhalation	2.70E-7 g
Human factors not influenced by risk management	
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	1 m^3
Ventilation rate	2 1/h
Contributing Scenario (15) controlling consumer exposure for PC 34	

Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products
Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - powder - Hand wash - Part B;
Calculation model	ConsExpo Detergent powder - Application
Frequency and duration of use	
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	10 %
Amounts used	
Dermal	19 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Other given operational conditions affecting consumers exposure	
Dermal	
Uptake fraction	100 %
Contributing Scenario (16) controlling consumer exposure for PC 34	
Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products
Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - powder - Residues on clothing (leaching) - Part C;
Calculation model	ConsExpo Detergent powder - Post-application
Frequency and duration of use	
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	20 %
Amounts used	
Dermal	1,000 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1.40E4 cm^2
Other given operational conditions affecting consumers exposure	
Dermal	
Uptake fraction	100 %
Skin contact factor	80 %
Leachable fraction	0.060 %
Contributing Scenario (17) controlling consumer exposure for PC 34	
Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products

Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - liquid - Machine wash - Part A;
Calculation model	ConsExpo Detergent liquid - Loading
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Exposure time	0.750 min
Application duration	0.300 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	60 %
Mol weight matrix	90 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	500 g
Dermal	0.010 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	1 m^3
Ventilation rate	2 1/h
Release are is constant	
Release area	20 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (18) controlling consumer exposure for PC 34	
Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products
Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - liquid - Hand wash - Part B;
Calculation model	ConsExpo Detergent powder - Application
Frequency and duration of use	
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	

Spray application	no
Product ingredient fraction by weight	10 %
Amounts used	
Dermal	19 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Other given operational conditions affecting consumers exposure	
Dermal	
Uptake fraction	100 %
Contributing Scenario (19) controlling consumer exposure for PC 34	
Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products
Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - liquid - Residues on clothing (leaching) - Part C;
Calculation model	ConsExpo Detergent liquid - Post-application
Frequency and duration of use	
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	60 %
Amounts used	
Dermal	1,000 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1.40E4 cm^2
Other given operational conditions affecting consumers exposure	
Dermal	
Uptake fraction	100 %
Skin contact factor	80 %
Leachable fraction	0.138 %
Contributing Scenario (20) controlling consumer exposure for PC 34	
Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products
Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - impregnation sprays - Spraying - Part A;
Calculation model	ConsExpo Spray spot remover - Application: spraying
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day

Weight fraction non-valotile	10 %
Max. diameter	100 µm
Spray duration	24.6 sec
Exposure duration	60 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Release duration	24.6 sec
Product characteristics	
Spray application	yes
Product ingredient fraction by weight	10 %
Amounts used	
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Contact rate	46 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	10 m^3
Ventilation rate	2.5 1/h
Room height	2.5 m
Mass generation rate	1.6 g/s
Airborne fraction	20 %
Density non-volatile	1.8 %
Droplet distribution	LogNormal, median: 100 µm, coeff. of variation: 0.600 µm, cut-off diameter: 15 µm
Dermal	
Uptake fraction	100 %
Contributing Scenario (21) controlling consumer exposure for PC 34	
Name of contributing scenario	PC 34 Textile dyes, finishing and impregnating products
Scenario subtitle	Textile dyes, finishing and impregnation products / Textile dyes - impregnation sprays - Leaving on - Part B;
Calculation model	ConsExpo Spray cleaner - Application: cleaning
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Exposure time	60 min
Application duration	10 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year

Product characteristics	
Spray application	no
Product ingredient fraction by weight	10 %
Mol weight matrix	22 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	16.2 g
Dermal	0.160 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	15 m^3
Ventilation rate	2.5 1/h
Release are is constant	
Release area	1.71E4 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %

Exposure Scenario 9 (ES9): Use in Cleaning agents (industrial)

Free short title	Use in Cleaning agents (industrial) (10)
Systematic title based on use descriptor	ERC 4; PROC 1, 2, 3, 4, 7, 8A, 8B, 10, 13
Name of contributing environmental scenario and corresponding ERC	ERC 4 Industrial use of processing aids
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 7 - Industrial spraying PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring
Contributing Scenario (1) controlling environmental exposure for ERC 4	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: "Spraying" Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.6 l/min Duration of exposure: 6 hours/day Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Ensure that worker is > 1 m from the source Local exhaust ventilation (Direction of airflow away from the worker): yes (effectiveness: ca. 50%) Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results: The predicted 75th percentile full-shift exposure is 6.6 mg/m³. The inter-quartile confidence interval is 3.4 mg/m³ to 13 mg/m³. Emission sources: Far field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Moderate application rate (0.3 - 3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: LEV systems (50.00 % reduction) Secondary localized controls: No (0 % reduction) Segregation: No segregation (0 % reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: Yes Process fully enclosed: No Room size: 1000 m³ Work area: Indoors Duration (mins): 360 Nonexposure period (mins): 120 Ventilation rate: 3 air changes per hour (ACH)

	Respiratory protection required: No
Contributing Scenario (7) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 10 (ES10): Use in Cleaning agents (professional)

Free short title	Use in Cleaning agents (professional) (11)
Systematic title based on use descriptor	ERC 8A, 8D; PROC 1, 2, 3, 4, 8A, 8B, 10, 11, 13
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8d Wide dispersive outdoor use of processing aids in open systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 10 - Roller application or brushing PROC 11 - Non industrial spraying PROC 13 - Treatment of articles by dipping and pouring
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
Contributing Scenario (2) controlling environmental exposure for ERC 8D	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (3) controlling professional worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling professional worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling professional worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling professional worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Qualitative Risk Assessment	

General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling professional worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Contributing Scenario (10) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Non industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	90 %
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: "Spraying" Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.05 l/min Duration of exposure: 150 mins Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Worker is within one meter of the source Direction of airflow: Not clearly away from the worker Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results (before RPE): The predicted 75th percentile full-shift exposure is 35 mg/m^3. The inter-quartile confidence interval is 18 mg/m^3 to 69 mg/m^3. Use of respiratory protection (90% reduction): upper-end inter-quartile confidence interval is 6.9 mg/m^3. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Low application rate (0.03 – 0.3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use

	Primary localized controls: No (0% reduction) Secondary localized controls: No (0 % reduction) Effective housekeeping practices in place: No General housekeeping in place: Yes Process fully enclosed: No Room size: 100 m³ Work area: Indoors Duration (mins): 150 Nonexposure period (mins): 330 Ventilation rate: Mechanical ventilation giving at least 1 ACH Use of respiratory protection (90% reduction): yes
Contributing Scenario (11) controlling professional worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 11 (ES11): Use in Cleaning agents (Consumer use)

Free short title	Use in Cleaning agents (Consumer use) (12)
Systematic title based on use descriptor	ERC 8A, 8D; PC 35
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8d Wide dispersive outdoor use of processing aids in open systems
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 35 Washing and Cleaning Products (including solvent based products) PC 35 Washing and Cleaning Products (including solvent based products) PC 35 Washing and Cleaning Products (including solvent based products) PC 35 Washing and Cleaning Products (including solvent based products) PC 35 Washing and Cleaning Products (including solvent based products) PC 35 Washing and Cleaning Products (including solvent based products)
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
Contributing Scenario (2) controlling environmental exposure for ERC 8D	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Contributing Scenario (3) controlling consumer exposure for PC 35	
Name of contributing scenario	PC 35 Washing and Cleaning Products (including solvent based products)
Scenario subtitle	Use in All-purpose cleaners - non-spraying products-Part A. Mixing and Loading
Calculation model	ConsExpo Liquid cleaner - Mixing & Loading
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	0.750 min
Application duration	0.300 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	20 %
Mol weight matrix	22 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	500 g
Dermal	0.010 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	1 m^3
Ventilation rate	0.500 1/h
Release are is constant	

Release area	20 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (4) controlling consumer exposure for PC 35	
Name of contributing scenario	PC 35 Washing and Cleaning Products (including solvent based products)
Scenario subtitle	Use in All-purpose cleaners - non-spraying products-Part B. Application
Calculation model	ConsExpo Liquid cleaner - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	240 min
Application duration	20 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	4 %
Mol weight matrix	18 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	400 g
Dermal	19 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	58 m^3
Ventilation rate	0.500 1/h
Release area increases over time	
Release area	1.00E5 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (5) controlling consumer exposure for PC 35	
Name of contributing scenario	PC 35 Washing and Cleaning Products (including solvent based products)
Scenario subtitle	Use in All-purpose cleaners - spraying products-Part A. Spraying
Calculation model	ConsExpo Spray cleaner - Application: spraying

Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Weight fraction non-valotile	5 %
Max. diameter	100 µm
Spray duration	24.6 sec
Exposure duration	60 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Release duration	2.6 sec
Product characteristics	
Spray application	yes
Product ingredient fraction by weight	5 %
Amounts used	
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Contact rate	46 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	15 m^3
Ventilation rate	2.5 1/h
Room height	2.5 m
Mass generation rate	0.780 g/s
Airborne fraction	20 %
Density non-volatile	1.8 %
Droplet distribution	LogNormal, median: 100 µm, coeff. of variation: 0.600 µm, cut-off diameter: 15 µm
Dermal	
Uptake fraction	100 %
Contributing Scenario (6) controlling consumer exposure for PC 35	
Name of contributing scenario	PC 35 Washing and Cleaning Products (including solvent based products)
Scenario subtitle	Use in All-purpose cleaners - spraying products-Part B. Cleaning
Calculation model	ConsExpo Spray cleaner - Application: cleaning
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Exposure time	60 min
Application duration	10 min

Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	5 %
Mol weight matrix	22 g/mol
Mass transfer rate	4,780 m/min
Amounts used	
Inhalation	16.2 g
Dermal	0.160 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	10 m^3
Ventilation rate	2.5 1/h
Release are is constant	
Release area	2.50E5 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (7) controlling consumer exposure for PC 35	
Name of contributing scenario	PC 35 Washing and Cleaning Products (including solvent based products)
Scenario subtitle	Use in All-purpose cleaners - Use in Floor cleaning products-Part A. Mixing and Loading
Calculation model	ConsExpo Floor cleaning liquid - Mixing & Loading
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	0.750 min
Application duration	0.300 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	2.5 %
Mol weight matrix	22 g/mol
Mass transfer rate	4,740 m/min

Amounts used	
Inhalation	500 g
Dermal	0.010 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	1 m^3
Ventilation rate	1 1/h
Release are is constant	
Release area	20 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (8) controlling consumer exposure for PC 35	
Name of contributing scenario	PC 35 Washing and Cleaning Products (including solvent based products)
Scenario subtitle	Use in All-purpose cleaners - Use in Floor cleaning products-Part B Application
Calculation model	ConsExpo Floor cleaning liquid - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	240 min
Application duration	30 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	2.5 %
Mol weight matrix	18 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	880 g
Dermal	19 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	58 m^3

Ventilation rate	0.500 1/h
Release area increases over time	
Release area	2.20E5 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %

Exposure Scenario 12 (ES12): Use in Lubricants (industrial)

Free short title	Use in Lubricants (industrial) (13)
Systematic title based on use descriptor	ERC 4, 7; PROC 1, 2, 3, 4, 7, 8A, 8B, 9, 10, 13, 17, 18
Name of contributing environmental scenario and corresponding ERC	ERC 4 Industrial use of processing aids ERC 7 Industrial use of substances in closed systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 7 - Industrial spraying PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring PROC 17 - Lubrication at high energy conditions and in partly open process PROC 18 - Greasing at high energy conditions
Contributing Scenario (1) controlling environmental exposure for ERC 4	
Contributing Scenario (2) controlling environmental exposure for ERC 7	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (3) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Industrial spraying
Human factors not influenced by risk management	

Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: "Spraying" Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.6 l/min Duration of exposure: 6 hours/day Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Ensure that worker is > 1 m from the source Local exhaust ventilation (Direction of airflow away from the worker): yes (effectiveness: ca. 50%) Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results: The predicted 75th percentile full-shift exposure is 6.6 mg/m^3. The inter-quartile confidence interval is 3.4 mg/m^3 to 13 mg/m^3. Emission sources: Far field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Moderate application rate (0.3 - 3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: LEV systems (50.00 % reduction) Secondary localized controls: No (0 % reduction) Segregation: No segregation (0 % reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: Yes Process fully enclosed: No Room size: 1000 m^3

	Work area: Indoors Duration (mins): 360 Nonexposure period (mins): 120 Ventilation rate: 3 air changes per hour (ACH) Respiratory protection required: No
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 17	
Name of contributing scenario	17 - Lubrication at high energy conditions and in partly open process
Scenario subtitle	Lubrication at high energy conditions and in partly open process.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 18	
Name of contributing scenario	18 - Greasing at high energy conditions
Scenario subtitle	Greasing at high energy conditions.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 13(ES13): Use in Metal-working fluids (industrial)

Free short title	Use in Metal-working fluids (industrial) (14)
Systematic title based on use descriptor	ERC 4; PROC 1, 2, 3, 4, 5, 7, 8A, 8B, 9, 10, 13, 17
Name of contributing environmental scenario and corresponding ERC	ERC 4 Industrial use of processing aids
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 7 - Industrial spraying PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring PROC 17 - Lubrication at high energy conditions and in partly open process
Contributing Scenario (1) controlling environmental exposure for ERC 4	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the “Exposure loading per shift body” was added with the 75th percentile of the “Exposure loading per shift hand”. The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: “Spraying” Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.6 l/min Duration of exposure: 6 hours/day Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Ensure that worker is > 1 m from the source Local exhaust ventilation (Direction of airflow away from the worker): yes (effectiveness: ca. 50%) Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)

Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results: The predicted 75th percentile full-shift exposure is 6.6 mg/m³. The inter-quartile confidence interval is 3.4 mg/m³ to 13 mg/m³. Emission sources: Far field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Moderate application rate (0.3 - 3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: LEV systems (50.00 % reduction) Secondary localized controls: No (0 % reduction) Segregation: No segregation (0 % reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: Yes Process fully enclosed: No Room size: 1000 m³ Work area: Indoors Duration (mins): 360 Nonexposure period (mins): 120 Ventilation rate: 3 air changes per hour (ACH) Respiratory protection required: No
Contributing Scenario (8) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (11) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (12) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 17	
Name of contributing scenario	17 - Lubrication at high energy conditions and in partly open process
Scenario subtitle	Lubrication at high energy conditions and in partly open process.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 14(ES14): Use in metal-working fluids (professional)

Free short title	Use in metal-working fluids (professional) (15)
Systematic title based on use descriptor	ERC 8A, 8D; PROC 1, 2, 3, 5, 8A, 8B, 9, 10, 11, 13, 17
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8d Wide dispersive outdoor use of processing aids in open systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 10 - Roller application or brushing PROC 11 - Non industrial spraying PROC 13 - Treatment of articles by dipping and pouring PROC 17 - Lubrication at high energy conditions and in partly open process
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
Contributing Scenario (2) controlling environmental exposure for ERC 8D	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (3) controlling professional worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling professional worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure

Scenario subtitle	Use in closed, continuous process with occasional controlled exposure.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling professional worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling professional worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant con-tact)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities

Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling professional worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling professional worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No

Respiratory protection	no
Contributing Scenario (10) controlling professional worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (11) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Non industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	90 %
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the “Exposure loading per shift body” was added with the 75th percentile of the “Exposure loading per shift hand”. The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: “Spraying” Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.05 l/min Duration of exposure: 150 mins Exposed skin surface: Whole body

	Location: Inside Direction of spraying: Level Segregation: Worker is within one meter of the source Direction of airflow: Not clearly away from the worker Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results (before RPE): The predicted 75th percentile full-shift exposure is 35 mg/m³. The inter-quartile confidence interval is 18 mg/m³ to 69 mg/m³. Use of respiratory protection (90% reduction): upper-end inter-quartile confidence interval is 6.9 mg/m³. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Low application rate (0.03 – 0.3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: No (0% reduction) Secondary localized controls: No (0 % reduction) Effective housekeeping practices in place: No General housekeeping in place: Yes Process fully enclosed: No Room size: 100 m³ Work area: Indoors Duration (mins): 150 Nonexposure period (mins): 330 Ventilation rate: Mechanical ventilation giving at least 1 ACH Use of respiratory protection (90% reduction): yes
Contributing Scenario (12) controlling professional worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm²
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	No
Contributing Scenario (13) controlling professional worker exposure for PROC 17	
Name of contributing scenario	17 - Lubrication at high energy conditions and in partly open process
Scenario subtitle	Lubrication at high energy conditions and in partly open process.

Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 15 (ES15): Use in Agrochemicals (professional)

Free short title	Use in Agrochemicals (professional) (16)
Systematic title based on use descriptor	ERC 8A, 8D; PROC 1, 2, 4, 8A, 8B, 9, 11, 13
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8d Wide dispersive outdoor use of processing aids in open systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 11 - Non industrial spraying PROC 13 - Treatment of articles by dipping and pouring
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
Contributing Scenario (2) controlling environmental exposure for ERC 8D	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (3) controlling professional worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling professional worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling professional worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling professional worker exposure for PROC 8B	

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling professional worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Non industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	90 %
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure.

	The 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: "Spraying" Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.05 l/min Duration of exposure: 150 mins Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Worker is within one meter of the source Direction of airflow: Not clearly away from the worker Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results (before RPE): The predicted 75th percentile full-shift exposure is 35 mg/m³. The inter-quartile confidence interval is 18 mg/m³ to 69 mg/m³. Use of respiratory protection (90% reduction): upper-end inter-quartile confidence interval is 6.9 mg/m³. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Low application rate (0.03 – 0.3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: No (0% reduction) Secondary localized controls: No (0 % reduction) Effective housekeeping practices in place: No General housekeeping in place: Yes Process fully enclosed: No Room size: 100 m³ Work area: Indoors Duration (mins): 150 Nonexposure period (mins): 330 Ventilation rate: Mechanical ventilation giving at least 1 ACH Use of respiratory protection (90% reduction): yes
Contributing Scenario (10) controlling professional worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 16 (ES16): Use in/as Functional fluids (industrial)

Free short title	Use in/as Functional fluids (industrial) (17)
Systematic title based on use descriptor	ERC 7; PROC 1, 2, 3, 4, 8A, 8B, 9
Name of contributing environmental scenario and corresponding ERC	ERC 7 Industrial use of substances in closed systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line)
Contributing Scenario (1) controlling environmental exposure for ERC 7	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	

Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 17 (ES17): Use in/as Functional fluids (professional)

Free short title	Use in/as Functional fluids (professional) (18)
Systematic title based on use descriptor	ERC 9A, 9B; PROC 1, 2, 3, 4, 8A, 9, 20

Name of contributing environmental scenario and corresponding ERC	ERC 9a Wide dispersive indoor use of substances in closed systems ERC 9b Wide dispersive outdoor use of substances in closed systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 20 - Heat and pressure transfer fluids (closed systems) in dispersive use
Contributing Scenario (1) controlling environmental exposure for ERC 9A	
Contributing Scenario (2) controlling environmental exposure for ERC 9B	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (3) controlling professional worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling professional worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling professional worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling professional worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling professional worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling professional worker exposure for PROC 20	
Name of contributing scenario	20 - Heat and pressure transfer fluids (closed systems) in dispersive use
Scenario subtitle	Heat and pressure transfer fluids in dispersive, professional use but closed systems.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 18 (ES18): Use in Heat transfer and Hydraulic fluids (Consumer use)

Free short title	Use in Heat transfer and Hydraulic fluids (Consumer use) (19)
Systematic title based on use descriptor	ERC 9A, 9B; PC 16
Name of contributing environmental scenario and corresponding ERC	ERC 9a Wide dispersive indoor use of substances in closed systems ERC 9b Wide dispersive outdoor use of substances in closed systems

Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 16 Heat Transfer Fluids PC 16 Heat Transfer Fluids
Contributing Scenario (1) controlling environmental exposure for ERC 9A	
Contributing Scenario (2) controlling environmental exposure for ERC 9B	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Contributing Scenario (3) controlling consumer exposure for PC 16	
Name of contributing scenario	PC 16 Heat Transfer Fluids
Scenario subtitle	Use in Heat transfer and Hydraulic fluids
Calculation model	dermal: External or measured values inhalation: External or measured values
Frequency and duration of use	
Frequency of use	0.547945 time(s)/day
Exposure time	0.250 h
Product characteristics	
Spray application	no
Product ingredient fraction by weight	30 %
Amounts used	
Amounts used	1,000 g
Human factors not influenced by risk management	
Skin surface area dermal	hands
Skin surface area oral	-
Other given operational conditions affecting consumers exposure	
Contributing Scenario (4) controlling consumer exposure for PC 16	
Name of contributing scenario	PC 16 Heat Transfer Fluids
Scenario subtitle	Use in Heat transfer and Hydraulic fluids
Calculation model	dermal: External or measured values inhalation: External or measured values
Frequency and duration of use	
Frequency of use	0.547945 time(s)/day
Exposure time	0.250 h
Product characteristics	
Spray application	no
Product ingredient fraction by weight	30 %
Amounts used	
Amounts used	1,000 g
Human factors not influenced by risk management	
Skin surface area dermal	hands
Skin surface area oral	-
Other given operational conditions affecting consumers exposure	

Exposure Scenario 19 (ES19): Use in/as De-icing/Anti-icing applications/agents (professional)

Free short title	Use in/as De-icing/Anti-icing applications/agents (professional) (20)
Systematic title based on use descriptor	ERC 8D; PROC 1, 2, 8A, 8B, 11
Name of contributing environmental scenario and corresponding ERC	ERC 8d Wide dispersive outdoor use of processing aids in open systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 11 - Non industrial spraying
Contributing Scenario (1) controlling environmental exposure for ERC 8D	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling professional worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling professional worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling professional worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling professional worker exposure for PROC 11	
Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	Non industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	90 %
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: "Spraying" Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.05 l/min Duration of exposure: 150 mins Exposed skin surface: Whole body Location: Inside Direction of spraying: Level Segregation: Worker is within one meter of the source Direction of airflow: Not clearly away from the worker Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results (before RPE): The predicted 75th percentile full-shift exposure is 35 mg/m³. The inter-quartile confidence interval is 18 mg/m³ to 69 mg/m³. Use of respiratory protection (90% reduction): upper-end inter-quartile confidence interval is 6.9 mg/m³. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Low application rate (0.03 – 0.3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: No (0% reduction) Secondary localized controls: No (0 % reduction) Effective housekeeping practices in place: No General housekeeping in place: Yes Process fully enclosed: No Room size: 100 m³ Work area: Indoors Duration (mins): 150

	Nonexposure period (mins): 330 Ventilation rate: Mechanical ventilation giving at least 1 ACH Use of respiratory protection (90% reduction): yes

Exposure Scenario 20(ES20): Use in/as De-icing/Anti-icing applications/agents(Consumer use)

Free short title	Use in/as De-icing/Anti-icing applications/agents (Consumer use) (21)
Systematic title based on use descriptor	ERC 8D; PC 4
Name of contributing environmental scenario and corresponding ERC	ERC 8d Wide dispersive outdoor use of processing aids in open systems
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 4 Anti-Freeze and De-icing products PC 4 Anti-Freeze and De-icing products PC 4 Anti-Freeze and De-icing products
Contributing Scenario (1) controlling environmental exposure for ERC 8D	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Contributing Scenario (2) controlling consumer exposure for PC 4	
Name of contributing scenario	PC 4 Anti-Freeze and De-icing products
Scenario subtitle	Use in De-icing applications - spraying products-Part A. Spraying
Calculation model	ConsExpo Glass cleaner - Application: spraying
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Weight fraction non-valotile	100 %
Max. diameter	100 µm
Spray duration	42 sec
Exposure duration	240 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Release duration	42 sec
Product characteristics	
Spray application	yes
Product ingredient fraction by weight	100 %
Amounts used	
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Contact rate	46 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	58 m^3
Ventilation rate	0.500 1/h
Room height	2.5 m
Mass generation rate	0.780 g/s
Airborne fraction	100 %
Density non-volatile	1.8 %

Droplet distribution	LogNormal, median: 100 µm, coeff. of variation: 0.600 µm, cut-off diameter: 15 µm
Dermal	
Uptake fraction	100 %
Contributing Scenario (3) controlling consumer exposure for PC 4	
Name of contributing scenario	PC 4 Anti-Freeze and De-icing products
Scenario subtitle	Use in De-icing applications - spraying products-Part B. Cleaning
Calculation model	ConsExpo Glass cleaner - Application: cleaning
Frequency and duration of use	
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	100 %
Amounts used	
Dermal	0.290 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Dermal	
Uptake fraction	100 %
Contributing Scenario (4) controlling consumer exposure for PC 4	
Name of contributing scenario	PC 4 Anti-Freeze and De-icing products
Scenario subtitle	Use in De-icing applications - Use in Anti-freezing agents
Calculation model	dermal: External or measured values inhalation: External or measured values
Frequency and duration of use	
Frequency of use	0.547945 time(s)/day
Exposure time	0.250 h
Product characteristics	
Spray application	no
Product ingredient fraction by weight	30 %
Amounts used	
Amounts used	1,000 g
Human factors not influenced by risk management	
Skin surface area dermal	hands
Skin surface area oral	-
Other given operational conditions affecting consumers exposure	

Exposure Scenario 21 (ES21): Use in laboratories (industrial)

Free short title	Use in laboratories (industrial) (22a)
Systematic title based on use descriptor	ERC 4; PROC 15
Name of contributing environmental scenario and corresponding ERC	ERC 4 Industrial use of processing aids
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 4	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use in laboratories (industrial)
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 22 (ES22): Use in laboratories (professional)

Free short title	Use in laboratories (professional) (22b)
Systematic title based on use descriptor	ERC 8A; PROC 15
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling professional worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use in laboratories (professional)
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 23 (ES23): Use in Water-treatment chemicals (industrial)

Free short title	Use in Water-treatment chemicals (industrial) (23)
Systematic title based on use descriptor	ERC 3, 4; PROC 1, 2, 3, 4, 8A, 8B, 13
Name of contributing environmental scenario and corresponding ERC	ERC 3 Formulation in articles ERC 4 Industrial use of processing aids
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 13 - Treatment of articles by dipping and pouring
Contributing Scenario (1) controlling environmental exposure for ERC 3	
Contributing Scenario (2) controlling environmental exposure for ERC 4	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (3) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).

Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 24: Use in Adhesives and Sealants (Consumer use)

Free short title	Use in Adhesives and Sealants (Consumer use) (24)
Systematic title based on use descriptor	ERC 8C, 8F; PC 1
Name of contributing environmental scenario and corresponding ERC	ERC 8c Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 1 Adhesives, Sealants (1) PC 1 Adhesives, Sealants (2) PC 1 Adhesives, Sealants (3)
Contributing Scenario (1) controlling environmental exposure for ERC 8C	
Contributing Scenario (2) controlling environmental exposure for ERC 8F	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Contributing Scenario (3) controlling consumer exposure for PC 1	
Name of contributing scenario	PC 1 Adhesives, Sealants (1)
Scenario subtitle	Use in adhesives and sealants
Calculation model	ConsExpo Carpet glue - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Exposure time	75 min
Application duration	75 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Release duration	4,500 sec
Product characteristics	
Spray application	no
Product ingredient fraction by weight	0.075 %
Mol weight matrix	3,000 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	9,000 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	110 cm^2
Contact rate	30 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	58 m^3
Ventilation rate	0.500 1/h
Release are is constant	
Release area	4.00E4 cm^2

Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (4) controlling consumer exposure for PC 1	
Name of contributing scenario	PC 1 Adhesives, Sealants (2)
Scenario subtitle	Use in sealant hose - indoors
Calculation model	ConsExpo
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Exposure time	2 min
Application duration	2 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Release duration	120 sec
Product characteristics	
Spray application	no
Product ingredient fraction by weight	50 %
Mol weight matrix	3,000 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	500 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	110 cm^2
Contact rate	30 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	25 m^3
Ventilation rate	0.500 1/h
Release are is constant	
Release area	4.00E4 cm^2
Release temperature	25 °C
Dermal	
Uptake fraction	100 %
Contributing Scenario (5) controlling consumer exposure for PC 1	
Name of contributing scenario	PC 1 Adhesives, Sealants (3)
Scenario subtitle	Use in sealant hose - outdoors
Calculation model	ConsExpo
Frequency and duration of use	

Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Exposure time	2 min
Application duration	2 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Release duration	120 sec
Product characteristics	
Spray application	no
Product ingredient fraction by weight	50 %
Mol weight matrix	3,000 g/mol
Mass transfer rate	4,740 m/min
Amounts used	
Inhalation	500 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	110 cm^2
Contact rate	30 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	1,000 m^3
Ventilation rate	1 1/h
Release are is constant	
Release area	4.00E4 cm^2
Release temperature	21 °C
Dermal	
Uptake fraction	100 %

Exposure Scenario 25: Production of Polymers, filled polymers, Foams, Coatings, Adhesives, Sealants

Free short title	Production of Polymers, filled polymers, Foams, Coatings, Adhesives, Sealants (25)
Systematic title based on use descriptor	ERC 2, 3, 5, 6C; PROC 1, 2, 3, 4, 5, 7, 8A, 8B, 9, 10, 13, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations ERC 3 Formulation in articles ERC 5 Industrial use resulting in inclusion into or onto a matrix ERC 6c Production of plastics
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 7 - Industrial spraying PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories
Contributing Scenario (1) controlling environmental exposure for ERC 2	
Contributing Scenario (2) controlling environmental exposure for ERC 3	
Contributing Scenario (3) controlling environmental exposure for ERC 5	
Contributing Scenario (4) controlling environmental exposure for ERC 6C	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (5) controlling industrial worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling industrial worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling industrial worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	No
Respiratory protection	no
Contributing Scenario (9) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (10) controlling industrial worker exposure for PROC 7	
Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	Industrial spraying
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Use of external/measured value dermal	The RISKSOFDERM V2.1 model has been used to estimate dermal exposure. The 75th percentile of the “Exposure loading per shift body” was added with the 75th percentile of the “Exposure loading per shift hand”. The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value. RISKOFDERM v2.1 – Process: “Spraying” Physical state: Liquid Concentration of substance: 100% Vapour pressure of the substance: 0.123 hPa Application rate: 0.6 l/min Duration of exposure: 6 hours/day Exposed skin surface: Whole body

	Location: Inside Direction of spraying: Level Segregation: Ensure that worker is > 1 m from the source Local exhaust ventilation (Direction of airflow away from the worker): yes (effectiveness: ca. 50%) Use of suitable gloves with basic training: Yes (Effectiveness: 90%) Wearing of appropriate working clothes (e.g. an overall): Yes (Effectiveness: 80%)
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Mechanistic model results: The predicted 75th percentile full-shift exposure is 6.6 mg/m³. The inter-quartile confidence interval is 3.4 mg/m³ to 13 mg/m³. Emission sources: Far field Process temperature: Room temperature Vapour pressure: 12.3 Pa Liquid weight fraction: 1 Viscosity: medium (oil-like) Substance product type: Liquids Situation: Surface spraying of liquids, Moderate application rate (0.3 - 3 l/minute) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: LEV systems (50.00 % reduction) Secondary localized controls: No (0 % reduction) Segregation: No segregation (0 % reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: Yes Process fully enclosed: No Room size: 1000 m³ Work area: Indoors Duration (mins): 360 Nonexposure period (mins): 120 Ventilation rate: 3 air changes per hour (ACH) Respiratory protection required: No
Contributing Scenario (11) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Contributing Scenario (12) controlling industrial worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (13) controlling industrial worker exposure for PROC 9	
Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (14) controlling industrial worker exposure for PROC 10	
Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	Roller application or brushing
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Contributing Scenario (15) controlling industrial worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no
Contributing Scenario (16) controlling industrial worker exposure for PROC 14	
Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (17) controlling industrial worker exposure for PROC 15	
Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	Use as laboratory reagent
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Exposure Scenario 26 (ES26): Production of rigid foam (Consumer use)

Free short title	Production of rigid foam (Consumer use) (26)
Systematic title based on use descriptor	ERC 8C, 8F; PC 32
Name of contributing environmental scenario and corresponding ERC	ERC 8c Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 32 Polymer Preparations and Compounds
Contributing Scenario (1) controlling environmental exposure for ERC 8C	
Contributing Scenario (2) controlling environmental exposure for ERC 8F	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Contributing Scenario (3) controlling consumer exposure for PC 32	
Name of contributing scenario	PC 32 Polymer Preparations and Compounds
Scenario subtitle	Production of rigid foam (Consumer use)
Calculation model	ConsExpo Insulation foam - Application
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	1 per day
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	1 per day
Product characteristics	
Spray application	no
Product ingredient fraction by weight	5 %
Amounts used	
Inhalation	825 g
Dermal	0.250 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	57.5 m^3
Ventilation rate	1.5 1/h
Dermal	
Uptake fraction	100 %

Exposure Scenario 27 (ES27): Use in Biocidal products (Consumer use)

Free short title	Use in Biocidal products (Consumer use) (27)
Systematic title based on use descriptor	ERC 8A, 8D; PC 8
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8d Wide dispersive outdoor use of processing aids in open systems
Name(s) of contributing consumer scenarios and corresponding PCs/ACs	PC 8 Biocidal Products (e.g. Disinfectants, pest control) PC 8 Biocidal Products (e.g. Disinfectants, pest control)
Contributing Scenario (1) controlling environmental exposure for ERC 8A	
Contributing Scenario (2) controlling environmental exposure for ERC 8D	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Contributing Scenario (3) controlling consumer exposure for PC 8	
Name of contributing scenario	PC 8 Biocidal Products (e.g. Disinfectants, pest control)
Scenario subtitle	Use in Biocidal products-Part A. Spraying
Calculation model	ConsExpo Disinfectants for use indoors: - Spraying
Frequency and duration of use	
Inhalation	
Exposure calculation result type	Mean concentration on day of exposure
Frequency of use	365 per year
Weight fraction non-valotile	80 %
Max. diameter	100 µm
Spray duration	30.6 sec
Exposure duration	60 min
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Release duration	2.6 sec
Product characteristics	
Spray application	yes
Product ingredient fraction by weight	100 %
Amounts used	
Human factors not influenced by risk management	
Exposed skin surface (dermal)	1,900 cm^2
Contact rate	46 mg/min
Other given operational conditions affecting consumers exposure	
Inhalation	
Room volume	15 m^3
Ventilation rate	2.5 1/h
Room height	2.5 m
Mass generation rate	0.750 g/s
Airborne fraction	20 %
Density non-volatile	1.8 %

Droplet distribution	LogNormal, median: 50 µm, coeff. of variation: 0.600 µm, cut-off diameter: 15 µm
Dermal	
Uptake fraction	100 %
Contributing Scenario (4) controlling consumer exposure for PC 8	
Name of contributing scenario	PC 8 Biocidal Products (e.g. Disinfectants, pest control)
Scenario subtitle	Use in Biocidal products-Part B. Wiping
Calculation model	ConsExpo Disinfectants for use indoors: - Wiping
Frequency and duration of use	
Dermal	
Exposure calculation result type	Internal dose chronic
Frequency of use	365 per year
Product characteristics	
Spray application	no
Product ingredient fraction by weight	100 %
Amounts used	
Dermal	0.020 g
Human factors not influenced by risk management	
Exposed skin surface (dermal)	215 cm^2
Other given operational conditions affecting consumers exposure	
Dermal	
Uptake fraction	100 %

Exposure Scenario 28 (ES28): Use in Water-treatment chemicals (professional)

Free short title	Use in Water-treatment chemicals (professional) (28)
Systematic title based on use descriptor	ERC 8F; PROC 1, 2, 3, 4, 8A, 8B, 13
Name of contributing environmental scenario and corresponding ERC	ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 13 - Treatment of articles by dipping and pouring
Contributing Scenario (1) controlling environmental exposure for ERC 8F	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (2) controlling professional worker exposure for PROC 1	
Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	Use in closed process, no likelihood of exposure
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (3) controlling professional worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling professional worker exposure for PROC 3	
Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	Use in closed batch process (synthesis or formulation).
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (5) controlling professional worker exposure for PROC 4	
Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	Use in batch and other process (synthesis) where opportunity for exposure arises.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (6) controlling professional worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Qualitative Risk Assessment	
General	In case no suitable local exhaust ventilation is present: Wear a suitable respiratory protection with adequate effectiveness (90%).
Human factors not influenced by risk management	

Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (7) controlling professional worker exposure for PROC 8B	
Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (8) controlling professional worker exposure for PROC 13	
Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	Treatment of articles by dipping and pouring.
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	Gloves APF 10 90 %
Respiratory protection	no

Exposure Scenario 29 (ES29): Use as Oilfield Chemicals

Free short title	Use as Oilfield Chemicals (29)
Systematic title based on use descriptor	ERC 2, 7; PROC 2, 5, 8A
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations ERC 7 Industrial use of substances in closed systems

Name(s) of contributing worker scenarios and corresponding PROCs	PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Contributing Scenario (1) controlling environmental exposure for ERC 2	
Contributing Scenario (2) controlling environmental exposure for ERC 7	
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.	
Product characteristics	
Physical state	liquid
Concentration in substance	100 %
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Contributing Scenario (3) controlling industrial worker exposure for PROC 2	
Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	Use in closed, continuous process with occasional controlled exposure
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no
Contributing Scenario (4) controlling industrial worker exposure for PROC 5	
Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

Contributing Scenario (5) controlling industrial worker exposure for PROC 8A	
Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	No
Respiratory protection	no

END OF SAFETY DATA SHEET