901143 - ACIDO MALICO GRANULAR 20/25 MESH

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier: 901143 - ACIDO MALICO GRANULAR 20/25 MESH

DL-malic acid

CAS: 617-48-1

EC: 210-514-9

Index: Non-applicable

REACH: 01-2119552463-40-XXXX

Other means of identification:

Non-applicable

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

Relevant uses: Food additive. For professional users/industrial user only.

Uses advised against: All uses not specified in this section or in section 7.3

1.3 Details of the supplier of the safety data sheet:

Quimidroga S.A.
C/ Tuset, 26
08006 Barcelona - Spain
Phone: +34 932363636 - Fax: +34 934154880
msds@quimidroga.com
www.quimidroga.com

1.4 Emergency telephone number: +34 932363636 (24h)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

CLP Regulation (EC) No 1272/2008:

Classification of this product has been carried out in accordance with CLP Regulation (EC) No 1272/2008.

Eye Irrit. 2: Eye irritation, Category 2, H319

2.2 Label elements:

CLP Regulation (EC) No 1272/2008:

Warning

Hazard statements:

Eye Irrit. 2: H319 - Causes serious eye irritation.

Precautionary statements:

P264: Wash thoroughly after handling.
P280: Wear protective gloves/protective clothing/respiratory protection/eye protection/protective footwear.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

2.3 Other hazards:

Product fails to meet PBT/vPvB criteria
Endocrine-disrupting properties: The product fails to meet the criteria.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance:

Chemical description: Carboxylic acids

Components:

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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS (continued)

In accordance with Annex II of Regulation (EC) No 1907/2006 (point 3), the product contains:

Identification	Chemical name/Classification		Concentration
CAS: 617-48-1 EC: 210-514-9 Index: Non-applicable REACH: 01-2119552463-40-XXXX	**DL-malic acid** Self-classified		**100 %**
	Regulation 1272/2008	Eye Irrit. 2: H319 - Warning	

To obtain more information on the hazards of the substances consult sections 11, 12 and 16.

3.2 Mixture:

Non-applicable

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures:

The symptoms resulting from intoxication can appear after exposure, therefore, in case of doubt, seek medical attention for direct exposure to the chemical product or persistent discomfort, showing the SDS of this product.

By inhalation:

This product does not contain substances classified as hazardous for inhalation, however, in case of symptoms of intoxication remove the person affected from the exposure area and provide with fresh air. Seek medical attention if the symptoms get worse or persist.

By skin contact:

In case of contact it is recommended to clean the affected area thoroughly with water and neutral soap. In case of changes to the skin (stinging, redness, rashes, blisters,…), seek medical advice with this Safety Data Sheet

By eye contact:

Rinse eyes thoroughly with lukewarm water for at least 15 minutes. Do not allow the person affected to rub or close their eyes. If the injured person uses contact lenses, these should be removed unless they are stuck to the eyes, in which case this could cause further damage. In all cases, after cleaning, a doctor should be consulted as quickly as possible with the SDS of the product.

By ingestion/aspiration:

In case of consumption, seek immediate medical assistance showing the SDS for the product.

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

Acute and delayed effects are indicated in sections 2 and 11.

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

Non-applicable

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media:

Suitable extinguishing media:

Product is non-flammable under normal conditions of storage, handling and use. In the case of combustion as a result of improper handling, storage or use preferably use polyvalent powder extinguishers (ABC powder), in accordance with the Regulation on fire protection systems.

Unsuitable extinguishing media:

Non-applicable

5.2 Special hazards arising from the substance or mixture:

As a result of combustion or thermal decomposition reactive sub-products are created that can become highly toxic and, consequently, can present a serious health risk.

5.3 Advice for firefighters:

Depending on the magnitude of the fire it may be necessary to use full protective clothing and self-contained breathing apparatus (SCBA). Minimum emergency facilities and equipment should be available (fire blankets, portable first aid kit,...) in accordance with Directive 89/654/EC.

Additional provisions:

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SECTION 5: FIREFIGHTING MEASURES (continued)

Act in accordance with the Internal Emergency Plan and the Information Sheets on actions to take after an accident or other emergencies. Eliminate all sources of ignition. In case of fire, cool the storage containers and tanks for products susceptible to combustion, explosion or BLEVE as a result of high temperatures. Avoid spillage of the products used to extinguish the fire into an aqueous medium.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures:

For non-emergency personnel:

Sweep up and shovel product or collect by other means and place in container for reuse (preferred) or disposal

For emergency responders:

Wear protective equipment. Keep unprotected persons away. See section 8.

6.2 Environmental precautions:

This product is not classified as hazardous to the environment. Keep product away from drains, surface and ground water.

6.3 Methods and material for containment and cleaning up:

It is recommended:

Sweep up and shovel product or collect by other means and place in container for reuse (preferred) or disposal

6.4 Reference to other sections:

See sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling:

A.- General precautions for safe use

Comply with the current legislation concerning the prevention of industrial risks with regards manually handling weights. Maintain order, cleanliness and destroy using safe methods (section 6).

B.- Technical recommendations for the prevention of fires and explosions

Due to its inflammable nature, the product does not present a fire risk under normal conditions of storage, handling and use.

C.- Technical recommendations on general occupational hygiene

Do not eat or drink during the process, washing hands afterwards with suitable cleaning products.

D.- Technical recommendations to prevent environmental risks

It is recommended to have absorbent material available at close proximity to the product (See subsection 6.3)

7.2 Conditions for safe storage, including any incompatibilities:

A.- Technical measures for storage

Minimum Temp.:	5 ºC
Maximum Temp.:	30 ºC
Maximum time:	6 Months

B.- General conditions for storage

Avoid sources of heat, radiation, static electricity and contact with food. For additional information see subsection 10.5

7.3 Specific end use(s):

Except for the instructions already specified it is not necessary to provide any special recommendation regarding the uses of this product.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters:

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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (continued)

Substances whose occupational exposure limits have to be monitored in the workplace (European OEL, not country-specific legislation):

Nuisance dust: Inhalable dust 10 mg/m3 // Respirable dust 4 mg/m3

DNEL (Workers):

		Short exposure		Long exposure	
Identification		Systemic	Local	Systemic	Local
DL-malic acid	Oral	Non-applicable	Non-applicable	Non-applicable	Non-applicable
CAS: 617-48-1	Dermal	40 mg/kg	Non-applicable	2 mg/kg	Non-applicable
EC: 210-514-9	Inhalation	104 mg/m³	104 mg/m³	5,33 mg/m³	32 mg/m³

DNEL (General population):

		Short exposure		Long exposure	
Identification		Systemic	Local	Systemic	Local
DL-malic acid	Oral	20 mg/kg	Non-applicable	6 mg/kg	Non-applicable
CAS: 617-48-1	Dermal	20 mg/kg	Non-applicable	6 mg/kg	Non-applicable
EC: 210-514-9	Inhalation	52 mg/m³	52 mg/m³	1,6 mg/m³	1,6 mg/m³

PNEC:

Identification				
DL-malic acid	STP	3 mg/L	Fresh water	0,1 mg/L
CAS: 617-48-1	Soil	Non-applicable	Marine water	0,01 mg/L
EC: 210-514-9	Intermittent	1 mg/L	Sediment (Fresh water)	Non-applicable
	Oral	Non-applicable	Sediment (Marine water)	Non-applicable

8.2 Exposure controls:

A.- Individual protection measures, such as personal protective equipment

As a preventative measure it is recommended to use basic Personal Protective Equipment, with the corresponding <<CE marking>> in accordance with Regulation (EU) 2016/425. For more information on Personal Protective Equipment (storage, use, cleaning, maintenance, class of protection,…) consult the information leaflet provided by the manufacturer. For more information see subsection 7.1. All information contained herein is a recommendation which needs some specification from the labour risk prevention services as it is not known whether the company has additional measures at its disposal.

B.- Respiratory protection

Pictogram	PPE	Labelling	CEN Standard	Remarks
 Compulsory use of face mask	Filter mask for particles	CE CAT III	EN 149:2001+A1:2009	Replace when an increase in resistence to breathing is observed.

C.- Specific protection for the hands

Pictogram	PPE	Labelling	CEN Standard	Remarks
 Mandatory hand protection	Protective gloves against minor risks	CE CAT I		Replace gloves in case of any sign of damage. For prolonged periods of exposure to the product for professional users/industrials, we recommend using CE III gloves in line with standards EN 420:2004+A1:2010 and EN ISO 374-1:2016+A1:2018

D.- Eye and face protection

Pictogram	PPE	Labelling	CEN Standard	Remarks
 Mandatory face protection	Panoramic glasses against splash/projections.	CE CAT II	EN 166:2002 EN ISO 4007:2018	Clean daily and disinfect periodically according to the manufacturer´s instructions. Use if there is a risk of splashing.

E.- Body protection

- CONTINUED ON NEXT PAGE -

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION (continued)

Pictogram	PPE	Labelling	CEN Standard	Remarks
	Work clothing	CE CAT I		Replace before any evidence of deterioration. For periods of prolonged exposure to the product for professional/industrial users CE III is recommended, in accordance with the regulations in EN ISO 6529:2013, EN ISO 6530:2005, EN ISO 13688:2013, EN 464:1994.
	Anti-slip work shoes	CE CAT II	EN ISO 20347:2012	Replace before any evidence of deterioration. For periods of prolonged exposure to the product for professional/industrial users CE III is recommended, in accordance with the regulations in EN ISO 20345:2012 y EN 13832-1:2007

F.- Additional emergency measures

Emergency measure	Standards	Emergency measure	Standards
Emergency shower	ANSI Z358-1 ISO 3864-1:2011, ISO 3864-4:2011	Eyewash stations	DIN 12 899 ISO 3864-1:2011, ISO 3864-4:2011

Environmental exposure controls:

In accordance with the community legislation for the protection of the environment it is recommended to avoid environmental spillage of both the product and its container. For additional information see subsection 7.1.D

Volatile organic compounds:

With regard to Directive 2010/75/EU, this product has the following characteristics:

V.O.C. (Supply):	0 % weight
V.O.C. density at 20 ºC:	0 kg/m³ (0 g/L)
Average carbon number:	Non-applicable
Average molecular weight:	Non-applicable

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties:

For complete information see the product datasheet.

Appearance:

Physical state at 20 ºC:	Solid
Appearance:	Granulated
Colour:	☐ White
Odour:	Odourless
Odour threshold:	Non-applicable *
Volatility:	
Boiling point at atmospheric pressure:	Non-applicable *
Vapour pressure at 20 ºC:	Non-applicable *
Vapour pressure at 50 ºC:	Non-applicable *
Evaporation rate at 20 ºC:	Non-applicable *
Product description:	
Density at 20 ºC:	Non-applicable *
Relative density at 20 ºC:	Non-applicable *
Dynamic viscosity at 20 ºC:	Non-applicable *
Kinematic viscosity at 20 ºC:	Non-applicable *
Kinematic viscosity at 40 ºC:	Non-applicable *

*Not relevant due to the nature of the product, not providing information property of its hazards.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES (continued)

Concentration:	Non-applicable *
pH:	Non-applicable *
Vapour density at 20 ºC:	Non-applicable *
Partition coefficient n-octanol/water 20 ºC:	-1,26
Solubility in water at 20 ºC:	558 kg/m³
Solubility properties:	Non-applicable *
Decomposition temperature:	Non-applicable *
Melting point/freezing point:	127 - 132 ºC
Flammability:	
Flash Point:	203 ºC
Flammability (solid, gas):	Non-applicable *
Autoignition temperature:	349 ºC
Lower flammability limit:	Non-applicable *
Upper flammability limit:	Non-applicable *
Explosive (Solid):	
Lower explosive limit:	Non-applicable *
Upper explosive limit:	Non-applicable *
Particle characteristics:	
Median equivalent diameter:	Non-applicable *

9.2 Other information:

Information with regard to physical hazard classes:

Explosive properties:	Non-applicable *
Oxidising properties:	Non-applicable *
Corrosive to metals:	Non-applicable *
Heat of combustion:	Non-applicable *
Aerosols-total percentage (by mass) of flammable components:	Non-applicable *
Other safety characteristics:	
Surface tension at 20 ºC:	Non-applicable *
Refraction index:	Non-applicable *

*Not relevant due to the nature of the product, not providing information property of its hazards.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity:

No hazardous reactions are expected because the product is stable under recommended storage conditions. See section 7.

10.2 Chemical stability:

Chemically stable under the indicated conditions of storage, handling and use.

10.3 Possibility of hazardous reactions:

Under the specified conditions, hazardous reactions that lead to excessive temperatures or pressure are not expected.

10.4 Conditions to avoid:

Applicable for handling and storage at room temperature:

Shock and friction	Contact with air	Increase in temperature	Sunlight	Humidity
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

10.5 Incompatible materials:

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SECTION 10: STABILITY AND REACTIVITY (continued)

Acids	Water	Oxidising materials	Combustible materials	Others
Avoid strong acids	Not applicable	Not applicable	Not applicable	Avoid alkalis or strong bases

10.6 Hazardous decomposition products:

See subsection 10.3, 10.4 and 10.5 to find out the specific decomposition products. Depending on the decomposition conditions, complex mixtures of chemical substances can be released: carbon dioxide (CO_2), carbon monoxide and other organic compounds.

SECTION 11: TOXICOLOGICAL INFORMATION

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

Dangerous health implications:

In case of exposure that is repetitive, prolonged or at concentrations higher than the recommended occupational exposure limits, adverse effects on health may result, depending on the means of exposure:

A- Ingestion (acute effect):

- Acute toxicity : Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for consumption. For more information see section 3
- Corrosivity/Irritability: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.

B- Inhalation (acute effect):

- Acute toxicity : Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for inhalation. For more information see section 3.
- Corrosivity/Irritability: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.

C- Contact with the skin and the eyes (acute effect):

- Contact with the skin: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for skin contact. For more information see section 3.
- Contact with the eyes: Produces eye damage after contact.

D- CMR effects (carcinogenicity, mutagenicity and toxicity to reproduction):

- Carcinogenicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for the effects mentioned. For more information see section 3.
  IARC: Non-applicable
- Mutagenicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.
- Reproductive toxicity: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.

E- Sensitizing effects:

- Respiratory: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous with sensitising effects. For more information see section 3.
- Skin: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.

F- Specific target organ toxicity (STOT) - single exposure:

Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.

G- Specific target organ toxicity (STOT)-repeated exposure:

- Specific target organ toxicity (STOT)-repeated exposure: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.
- Skin: Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.

H- Aspiration hazard:

Based on available data, the classification criteria are not met, as it does not contain substances classified as hazardous for this effect. For more information see section 3.

Other information:

Non-applicable

Product-specific toxicological information:

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SECTION 11: TOXICOLOGICAL INFORMATION (continued)

Acute toxicity		Genus
LD50 oral	10700 mg/kg	Rat

Specific toxicology information on the substances:

Identification	Acute toxicity		Genus
DL-malic acid	LD50 oral	10700 mg/kg	Rat
CAS: 617-48-1	LD50 dermal	>2000 mg/kg	
EC: 210-514-9	LC50 inhalation	>5 mg/L	

11.2 Information on other hazards:

Endocrine disrupting properties

Endocrine-disrupting properties: The product fails to meet the criteria.

Other information

Non-applicable

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity:

Not available

12.2 Persistence and degradability:

Not available

12.3 Bioaccumulative potential:

Not available

12.4 Mobility in soil:

Not available

12.5 Results of PBT and vPvB assessment:

Product fails to meet PBT/vPvB criteria

12.6 Endocrine disrupting properties:

Endocrine-disrupting properties: The product fails to meet the criteria.

12.7 Other adverse effects:

Not described

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:

Code	Description	Waste class (Regulation (EU) No 1357/2014)
20 01 14*	Acids	Dangerous

Type of waste (Regulation (EU) No 1357/2014):

HP4 Irritant — skin irritation and eye damage

Waste management (disposal and evaluation):

Consult the authorized waste service manager on the assessment and disposal operations in accordance with Annex 1 and Annex 2 (Directive 2008/98/EC). As under 15 01 (2014/955/EC) of the code and in case the container has been in direct contact with the product, it will be processed the same way as the actual product. Otherwise, it will be processed as non-dangerous residue. Waste should not be disposed of to drains. See paragraph 6.2.

Regulations related to waste management:

In accordance with Annex II of Regulation (EC) No 1907/2006 (REACH) the community or state provisions related to waste management are stated

Community legislation: Directive 2008/98/EC, 2014/955/EU, Regulation (EU) No 1357/2014

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SECTION 14: TRANSPORT INFORMATION

This product is not regulated for transport (ADR/RID,IMDG,IATA)

SECTION 15: REGULATORY INFORMATION

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

Candidate substances for authorisation under the Regulation (EC) No 1907/2006 (REACH): Non-applicable

Substances included in Annex XIV of REACH ("Authorisation List") and sunset date: Non-applicable

Regulation (EC) No 1005/2009, about substances that deplete the ozone layer: Non-applicable

Article 95, REGULATION (EU) No 528/2012: Non-applicable

REGULATION (EU) No 649/2012, in relation to the import and export of hazardous chemical products: Non-applicable

Seveso III:

Non-applicable

Limitations to commercialisation and the use of certain dangerous substances and mixtures (Annex XVII REACH, etc ....):

Non-applicable

Specific provisions in terms of protecting people or the environment:

It is recommended to use the information included in this safety data sheet as a basis for conducting workplace-specific risk assessments in order to establish the necessary risk prevention measures for the handling, use, storage and disposal of this product.

Other legislation:

The product could be affected by sectorial legislation

HACCP: Hazard analysis and critical control points, ISO: 22000

15.2 Chemical safety assessment:

The supplier has not carried out evaluation of chemical safety.

SECTION 16: OTHER INFORMATION

Legislation related to safety data sheets:

The SDS shall be supplied in an official language of the country where the product is placed on the market. This safety data sheet has been designed in accordance with ANNEX II-Guide to the compilation of safety data sheets of Regulation (EC) No 1907/2006 (COMMISSION REGULATION (EU) 2020/878).

Modifications related to the previous Safety Data Sheet which concerns the ways of managing risks.:

COMMISSION REGULATION (EU) 2020/878

Texts of the legislative phrases mentioned in section 2:

H319: Causes serious eye irritation.

Texts of the legislative phrases mentioned in section 3:

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3

CLP Regulation (EC) No 1272/2008:

Eye Irrit. 2: H319 - Causes serious eye irritation.

Advice related to training:

Training is recommended in order to prevent industrial risks for staff using this product and to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources:

http://echa.europa.eu
http://eur-lex.europa.eu

Abbreviations and acronyms:

- CONTINUED ON NEXT PAGE -

SECTION 16: OTHER INFORMATION (continued)

ADR: European agreement concerning the international carriage of dangerous goods by road
IMDG: International maritime dangerous goods code
IATA: International Air Transport Association
ICAO: International Civil Aviation Organisation
COD: Chemical Oxygen Demand
BOD5: 5day biochemical oxygen demand
BCF: Bioconcentration factor
LD50: Lethal Dose 50
LC50: Lethal Concentration 50
EC50: Effective concentration 50
LogPOW: Octanolwater partition coefficient
Koc: Partition coefficient of organic carbon
UFI: unique formula identifier
IARC: International Agency for Research on Cancer

- END OF SAFETY DATA SHEET -

Section 1: Title of exposure scenario	
Contributing scenario controlling environmental exposure	ERC2 Formulation of mixture in closed and open systems
Contributing scenario controlling worker exposure	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations PROC15 Use as laboratory reagent
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of mixture in closed and open systems	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.45 tonnes/day
Annual use at site	≤ 100 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	

Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)

Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance	
Product (article) characteristic	

Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)

Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	

Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Section 3: Exposure estimation and reference to its source	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of mixture in closed and open systems	

Release route	**Release rate**	**Release estimation method**
Water	9 kg/day	ERC based
Air	11.25 kg/day	ERC based
Soil	0.045 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.057 mg/L	0.572
Sea water	0.006 mg/L	0.572

Sewage treatment plant	0.57 mg/L	0.19
Man via Environment - Inhalation	0.002 mg/m³	<0.01
Man via Environment - Oral	0.278 mg/kg bw/day	0.046
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.362
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	<0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 2: Use at industrial site - Substance incorporated into article

Section 1: Title of exposure scenario	
Contributing scenario controlling environmental exposure	ERC5 Uses for industrial manual electroplating surface treatment
Contributing scenario controlling worker exposure	PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC2 Use in closed, continuous process with occasional controlled exposure - Metal cleaner (degreaser, descaler, etch); Automatic process PROC10 Roller application or brushing - Metal cleaner (degreaser, descaler, etch); Manual process PROC7 Industrial spraying PROC13 Treatment of articles by dipping and pouring PROC15 Use as laboratory reagent
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC5 Uses for industrial manual electroplating surface treatment	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.45 tonnes/day

Annual use at site	≤ 100 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)

Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure - Metal cleaner (degreaser, descaler, etch); Automatic process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	Yes. [Effectiveness - Inhalation: 90%]
Local exhaust ventilation (Dermal)	No. [Effectiveness - Dermal: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC10 Roller application or brushing - Metal cleaner (degreaser, descaler, etch); Manual process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	Yes. [Effectiveness - Inhalation: 90%]
Local exhaust ventilation (Dermal)	No. [Effectiveness - Dermal: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (4) PROC7 Industrial spraying	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	Yes. [Effectiveness - Inhalation: 95%]
Local exhaust ventilation (Dermal)	Yes. [Effectiveness - Dermal: 95%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands and upper wrists (1500 cm^2)
Contributing scenario controlling worker exposure (5) PROC13 Treatment of articles by dipping and pouring	
Product (article) characteristic	
Dustiness of material	Low

Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	Yes. [Effectiveness - Inhalation: 90%]
Local exhaust ventilation (Dermal)	No. [Effectiveness - Dermal: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (6) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	One hand face only (240 cm^2)

Section 3: Exposure estimation and reference to its source

Contributing scenario controlling environmental exposure (1)
ERC5 Uses for industrial manual electroplating surface treatment

Release route	Release rate	Release estimation method
Water	9 kg/day	Release factor
Air	78.75 kg/day	Release factor
Soil	1 %	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.057 mg/L	0.572
Sea water	0.006 mg/L	0.572
Sewage treatment plant	0.57 mg/L	0.19
Man via Environment - Inhalation	0.013 mg/m^3	<0.01
Man via Environment - Oral	1.941 mg/kg bw/day	0.324

Contributing scenario controlling worker exposure (1)
PROC8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

Method: TRA Worker v3

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.07 mg/m^3	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m^3	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m^3	<0.01
Inhalation, Local effects, Acute	0.28 mg/m^3	<0.01
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (2)
PROC2 Use in closed, continuous process with occasional controlled exposure - Metal cleaner (degreaser, descaler, etch); Automatic process

Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	7 X 10^{-4} mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.003 mg/m³	<0.01
Inhalation, Local effects, Long Term	7 X 10^{-4} mg/m³	<0.01
Inhalation, Local effects, Acute	0.003 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.01 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	0.034
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC10 Roller application or brushing - Metal cleaner (degreaser, descaler, etch); Manual process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.035 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.14 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.035 mg/m³	<0.01
Inhalation, Local effects, Acute	0.14 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.692
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (4) PROC7 Industrial spraying		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**

Inhalation, Systemic effects, Long Term	0.035 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.14 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.035 mg/m³	<0.01
Inhalation, Local effects, Acute	0.14 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.107 mg/kg bw/day	0.054
Dermal, Local effects, Long Term	0.005 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	0.06
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (5) PROC13 Treatment of articles by dipping and pouring		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.007 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.028 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.007 mg/m³	<0.01
Inhalation, Local effects, Acute	0.028 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.344
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (6) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01

Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.017 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.005 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	0.022
Combined routes, Systemic effects, Acute	-	<0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 3: Formulation - SpERC: AISE 2.1b.V2 - (granular cleaning and maintenance products: medium scale)

Section 1: Title of exposure scenario	
Contributing scenario controlling environmental exposure	ERC2 Formulation - water treatment and washing and cleaning products
Contributing scenario controlling worker exposure	PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation - water treatment and washing and cleaning products	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 4.5 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days

Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	

Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (3) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient

Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (6) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Good general ventilation (3-5 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation - water treatment and washing and cleaning products		
Release route	**Release rate**	**Release estimation method**
Water	4.5 kg/day	SpERC based
Air	0 kg/day	SpERC based
Soil	0 %	SpERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.029 mg/L	0.287
Sea water	0.003 mg/L	0.287
Sewage treatment plant	0.285 mg/L	0.095
Man via Environment - Inhalation	3.014 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	1.328 X 10^{-4} mg/kg bw/day	<0.01
Contributing scenario controlling worker exposure (1) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013

Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.035 mg/kg bw/day	0.017
Dermal, Local effects, Long Term	0.01 mg/cm^2	0.01
Combined routes, Systemic effects, Long Term	-	0.03
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011
Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects,	0.685 mg/kg bw/day	0.343

Long Term		
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.408
Combined routes, Systemic effects, Acute	-	0.013
Contributing scenario controlling worker exposure (4) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011
Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.408
Combined routes, Systemic effects, Acute	-	0.013
Contributing scenario controlling worker exposure (5) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic	-	<0.01

effects, Acute		
Contributing scenario controlling worker exposure (6) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.343 mg/kg bw/day	0.172
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.185
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (7) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011
Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.408
Combined routes, Systemic effects, Acute	-	0.013
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 4: Formulation - SpERC: AISE 2.1b.V2 - (Liquid cleaning and maintenance products: low viscosity: medium scale)

Section 1: Title of exposure scenario	
Contributing scenario controlling environmental exposure	ERC2 Formulation
Contributing scenario controlling worker exposure	PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 4.5 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	

Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient

Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (3) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (6) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation		
Release route	**Release rate**	**Release estimation method**
Water	4.5 kg/day	SpERC based
Air	0 kg/day	SpERC based
Soil	0 %	SpERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.029 mg/L	0.287
Sea water	0.003 mg/L	0.287
Sewage treatment plant	0.285 mg/L	0.095
Man via Environment - Inhalation	3.014 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	1.328 X 10^{-4} mg/kg bw/day	<0.01
Contributing scenario controlling worker exposure (1) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**

Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.035 mg/kg bw/day	0.017
Dermal, Local effects, Long Term	0.01 mg/cm^2	0.01
Combined routes, Systemic effects, Long Term	-	0.03
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011
Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.408
Combined routes, Systemic effects, Acute	-	0.013
Contributing scenario controlling worker exposure (4) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011

Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.408
Combined routes, Systemic effects, Acute	-	0.013
Contributing scenario controlling worker exposure (5) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (6) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	<0.01
Inhalation, Local effects, Acute	0.28 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.343 mg/kg bw/day	0.172
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic	-	0.185

effects, Long Term		
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (7) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011
Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects, Long Term	0.685 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.408
Combined routes, Systemic effects, Acute	-	0.013
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 5: Use at industrial site: Intermediate

Section 1: Title of exposure scenario	
Sectors of use [SU]	SU8 Manufacture of bulk, large scale chemicals (including petroleum products) SU9 Manufacture of fine chemicals
Contributing scenario controlling environmental exposure	ERC6a Use at industrial site: Intermediate
Contributing scenario controlling worker exposure	PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC8b Receiving and charging of the substance PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC15 Use as laboratory reagent
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC6a Use at industrial site: Intermediate	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.45 tonnes/day
Annual use at site	≤ 100 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (3) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (4) PROC1 Use in closed process, no likelihood of exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (5) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (6) PROC3 Use in closed batch process (synthesis or formulation)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (7) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	Two hands face (480 cm^2)	
Contributing scenario controlling worker exposure (8) PROC15 Use as laboratory reagent		
Product (article) characteristic		
Dustiness of material	Low	
Concentration of substance in mixture	Substance as such	
Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	One hand face only (240 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC6a Use at industrial site: Intermediate		
Release route	**Release rate**	**Release estimation method**
Water	9 kg/day	ERC based
Air	22.5 kg/day	ERC based
Soil	0.45 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.057 mg/L	0.572
Sea water	0.006 mg/L	0.572
Sewage treatment plant	0.57 mg/L	0.19
Man via Environment - Inhalation	0.004 mg/m^3	<0.01

Man via Environment - Oral	0.555 mg/kg bw/day	0.093
Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (2) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (3) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (4) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (5) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (6) PROC3 Use in closed batch process (synthesis or formulation)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.138 mg/kg bw/day	0.069
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.088
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (7) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019

Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (8) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	<0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 6: Formulation of water treatment and washing and cleaning products

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC2 Adsorbents PC20 Products such as ph-regulators, flocculants, precipitants, neutralization agents PC35 Washing and cleaning products (including solvent based products) PC36 Water softeners PC37 Water treatment chemicals PC40 Extraction agents
Contributing scenario controlling environmental exposure	ERC2 Formulation of water treatment and washing and cleaning products
Contributing scenario controlling worker exposure	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations PROC15 Use as laboratory reagent PROC21 Low energy manipulation of substances bound in materials and/or articles
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of water treatment and washing and cleaning products	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days

Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low

Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (12) PROC21 Low energy manipulation of substances bound in materials and/or articles	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)

Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands and forearms (1980 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of water treatment and washing and cleaning products		
Release route	**Release rate**	**Release estimation method**
Water	14 kg/day	ERC based
Air	17.5 kg/day	ERC based
Soil	0.07 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.089 mg/L	0.889
Sea water	0.009 mg/L	0.889
Sewage treatment plant	0.886 mg/L	0.295
Man via Environment - Inhalation	0.003 mg/m^3	<0.01
Man via Environment - Oral	0.417 mg/kg bw/day	0.07
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m^3	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m^3	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m^3	<0.01

Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2

Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.362
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (12) PROC21 Low energy manipulation of substances bound in materials and/or articles		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.188
Inhalation, Systemic effects, Acute	4 mg/m³	0.038
Inhalation, Local effects, Long Term	1 mg/m³	0.031
Inhalation, Local effects, Acute	4 mg/m³	0.038
Dermal, Systemic effects, Long Term	0.283 mg/kg bw/day	0.142
Dermal, Local effects, Long Term	0.01 mg/cm^2	0.01
Combined routes, Systemic effects, Long Term	-	0.329
Combined routes, Systemic effects, Acute	-	0.038
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 7: Use at industrial sites of water treatment washing and cleaning products

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC2 Adsorbents PC20 Products such as ph-regulators, flocculants, precipitants, neutralization agents PC35 Washing and cleaning products (including solvent based products) PC36 Water softeners PC37 Water treatment chemicals PC40 Extraction agents
Sectors of use [SU]	SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
Contributing scenario controlling environmental exposure	ERC7 Use at industrial site
Contributing scenario controlling worker exposure	PROC2 Use/production of water treatment chemicals or washing and cleaning products in closed system with occasional controlled exposure PROC8b Raw material receipt and transfer PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 Preparation of water treatment chemicals or washing and cleaning products product

	PROC14 Preparation production (general) PROC21 Low energy manipulation of substances bound in materials and/or articles PROC8a Batch loading of equipment (manual, non dedicated) PROC8a Manual cleaning and maintenance of equipment
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC7 Use at industrial site	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.3 tonnes/day
Annual use at site	≤ 75 tonnes/year
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC2 Use/production of water treatment chemicals or washing and cleaning products in closed system with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (2) PROC8b Raw material receipt and transfer	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in	>25%

mixture	
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC5 Preparation of water treatment chemicals or washing and cleaning products product	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]

Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (5) PROC14 Preparation production (general)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (6) PROC21 Low energy manipulation of substances bound in materials and/or articles	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	

Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands and forearms (1980 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Batch loading of equipment (manual, non dedicated)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Batch loading of equipment (manual, non dedicated)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (8) PROC8a Manual cleaning and maintenance of equipment	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)

Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Section 3: Exposure estimation and reference to its source	
Contributing scenario controlling environmental exposure (1) ERC7 Use at industrial site	

Release route	**Release rate**	**Release estimation method**
Water	6 kg/day	Release factor
Air	0.3 kg/day	Release factor
Soil	15 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.038 mg/L	0.382
Sea water	0.004 mg/L	0.382
Sewage treatment plant	0.38 mg/L	0.127
Man via Environment - Inhalation	5.712 X 10^{-5} mg/m³	<0.01
Man via Environment - Oral	0.009 mg/kg bw/day	<0.01

Contributing scenario controlling worker exposure (1)
PROC2 Use/production of water treatment chemicals or washing and cleaning products in closed system with occasional controlled exposure

Method: TRA Worker v3

Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01

Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC8b Raw material receipt and transfer		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.437

Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC5 Preparation of water treatment chemicals or washing and cleaning products product		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (5) PROC14 Preparation production (general)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	<0.01
Inhalation, Local effects, Acute	0.4 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.343 mg/kg bw/day	0.172
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.19
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (6) PROC21 Low energy manipulation of substances bound in materials and/or articles		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	1 mg/m³	0.188
Inhalation, Systemic effects, Acute	4 mg/m³	0.038
Inhalation, Local effects, Long Term	1 mg/m³	0.031
Inhalation, Local effects, Acute	4 mg/m³	0.038
Dermal, Systemic effects, Long Term	0.283 mg/kg bw/day	0.142
Dermal, Local effects, Long Term	0.01 mg/cm^2	0.01
Combined routes, Systemic effects, Long Term	-	0.329
Combined routes, Systemic effects, Acute	-	0.038
Contributing scenario controlling worker exposure (7) PROC8a Batch loading of equipment (manual, non dedicated)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011
Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.751
Combined routes, Systemic effects, Acute	-	0.013
Contributing scenario controlling worker exposure (8) PROC8a Manual cleaning and maintenance of equipment		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.3 mg/m³	0.056
Inhalation, Systemic effects, Acute	1.2 mg/m³	0.012

Inhalation, Local effects, Long Term	0.3 mg/m³	<0.01
Inhalation, Local effects, Acute	1.2 mg/m³	0.012
Dermal, Systemic effects, Long Term	0.823 mg/kg bw/day	0.411
Dermal, Local effects, Long Term	0.06 mg/cm^2	0.06
Combined routes, Systemic effects, Long Term	-	0.468
Combined routes, Systemic effects, Acute	-	0.012
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 8: Professional use in water treatment and cleaning products

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC2 Adsorbents PC20 Products such as ph-regulators, flocculants, precipitants, neutralization agents PC35 Washing and cleaning products (including solvent based products) PC36 Water softeners PC37 Water treatment chemicals PC40 Extraction agents
Contributing scenario controlling environmental exposure	ERC8a Professional use in water treatment and cleaning products
Contributing scenario controlling worker exposure	PROC8b Raw material receipt and transfer PROC5 Batch or other process with opportunity for exposure PROC21 Low energy manipulation of substances bound in materials and/or articles PROC8a Transfer in non-dedicated facilities
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8a Professional use in water treatment and cleaning products	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 5.5 X 10^{-6} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days

Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8b Raw material receipt and transfer	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC5 Batch or other process with opportunity for exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%

Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC21 Low energy manipulation of substances bound in materials and/or articles	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands and forearms (1980 cm^2)	
Contributing scenario controlling worker exposure (4) PROC8a Transfer in non-dedicated facilities		
Product (article) characteristic		
Dustiness of material	Low	
Concentration of substance in mixture	>25%	
Solid in solid mixtures	Yes	
Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC8a Professional use in water treatment and cleaning products		
Release route	**Release rate**	**Release estimation method**
Water	0.006 kg/day	ERC based
Air	0.006 kg/day	ERC based
Soil	0 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.988 X 10^{-4} mg/L	<0.01

Sea water	2.869 X 10^{-5} mg/L	<0.01
Sewage treatment plant	3.481 X 10^{-4} mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.299 X 10^{-5} mg/kg bw/day	<0.01
Contributing scenario controlling worker exposure (1) PROC8b Raw material receipt and transfer		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (2) PROC5 Batch or other process with opportunity for exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.188
Inhalation, Systemic effects, Acute	4 mg/m³	0.038
Inhalation, Local effects, Long Term	1 mg/m³	0.031
Inhalation, Local effects, Acute	4 mg/m³	0.038
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.873
Combined routes, Systemic effects, Acute	-	0.038

Contributing scenario controlling worker exposure (3) PROC21 Low energy manipulation of substances bound in materials and/or articles		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	3 mg/m³	0.563
Inhalation, Systemic effects, Acute	12 mg/m³	0.115
Inhalation, Local effects, Long Term	3 mg/m³	0.094
Inhalation, Local effects, Acute	12 mg/m³	0.115
Dermal, Systemic effects, Long Term	0.283 mg/kg bw/day	0.142
Dermal, Local effects, Long Term	0.01 mg/cm^2	0.01
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	0.115
Contributing scenario controlling worker exposure (4) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 9: Consumer water treatment and cleaning product use

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC2 Adsorbents PC20 Products such as ph-regulators, flocculants, precipitants, neutralization agents PC35 Washing and cleaning products (including solvent based products) PC36 Water softeners PC37 Water treatment chemicals PC40 Extraction agents
Contributing scenario controlling environmental exposure	ERC8a Consumer water treatment and cleaning product use
Contributing scenario controlling consumer exposure	PC36 Water softeners PC35 Washing and cleaning products PC37 Water treatment chemicals PC2 Adsorbents
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8a Consumer water treatment and cleaning product use	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 3.575 X 10^{-5} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^{3} m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^{4} m^3/days
Contributing scenario controlling consumer exposure (1) PC36 Water softeners	
Product (article) characteristic	
Product/ Article subcategory	No value
Contributing scenario controlling consumer exposure (2)	

PC35 Washing and cleaning products		
Product (article) characteristic		
Product/ Article subcategory	Cleaners, liquids (all purposes cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)	
Concentration of substance in mixture	0.8 g/g “Concentration of the substance in the product has been set to up to 100% (substance as such) for assessment purposes”	
Oral contact foreseen	No.	
Amounts used, Frequency and duration of use		
Amount of product used per application	500 g/event	
Exposure time	0.33 hour(s)	
Frequency of use	1 event/day	
Other conditions affecting consumers exposure		
Body parts potentially exposed	Fingertips	
Dermal transfer factor	1	
Contributing scenario controlling consumer exposure (3) PC37 Water treatment chemicals		
Product (article) characteristic		
Product/ Article subcategory	No value	
Contributing scenario controlling consumer exposure (4) PC2 Adsorbents		
Product (article) characteristic		
Product/ Article subcategory	No value	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC8a Consumer water treatment and cleaning product use		
Release route	**Release rate**	**Release estimation method**
Water	0.036 kg/day	ERC based
Air	0.036 kg/day	ERC based
Soil	0 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	4.86×10^{-4} mg/L	<0.01
Sea water	4.746×10^{-5} mg/L	<0.01
Sewage treatment plant	0.002 mg/L	<0.01
Man via Environment - Inhalation	3.011×10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.624×10^{-5} mg/kg bw/day	<0.01

Contributing scenario controlling consumer exposure (1) PC36 Water softeners		
Not available		
Contributing scenario controlling consumer exposure (2) PC35 Washing and cleaning products		
Method: TRA Consumer v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.022 mg/m³	0.014
Inhalation, Local effects, Long Term	0.022 mg/m³	0.014
Dermal, Systemic effects, Long Term	4.76 mg/kg bw/day	0.793
Oral, Systemic effects, Long Term	0 mg/kg bw/day	< 0.01
Combined routes, Systemic effects, Long Term	-	0.807
Contributing scenario controlling consumer exposure (3) PC37 Water treatment chemicals		
Not available		
Contributing scenario controlling consumer exposure (4) PC2 Adsorbents		
Not available		
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 10: Formulation - SpERC: Cosmetics Europe / AISE 2.3b.V2 - (medium scale)

Section 1: Title of exposure scenario

Chemical product category [PC]	PC29 Pharmaceuticals PC39 Cosmetics, personal care products
Contributing scenario controlling environmental exposure	ERC2 Formulation of preparations
Contributing scenario controlling worker exposure	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations PROC15 Use as laboratory reagent
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.5 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety	Advanced

Management System	
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low

Concentration of substance in mixture	Substance as such	
Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	One hand face only (240 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations		
Release route	**Release rate**	**Release estimation method**
Water	0.5 kg/day	SpERC based
Air	0 kg/day	SpERC based
Soil	0 kg/day	SpERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.003 mg/L	0.034
Sea water	3.416 X 10^{-4} mg/L	0.034
Sewage treatment plant	0.032 mg/L	0.011
Man via Environment - Inhalation	2.914 X 10^{-11} mg/m^3	< 0.01
Man via Environment - Oral	1.049 X 10^{-4} mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.28 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.362
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 11: Formulation - SpERC: Cosmetics Europe / AISE 2.1b.V2 - (medium scale)

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC29 Pharmaceuticals PC39 Cosmetics, personal care products
Contributing scenario controlling environmental exposure	ERC2 Formulation of preparations
Contributing scenario controlling worker exposure	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations PROC15 Use as laboratory reagent
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations	

Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.2 tonnes/day
Annual use at site	≤ 50 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low

Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)

Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)

Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	One hand face only (240 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations		
Release route	**Release rate**	**Release estimation method**
Water	0.4 kg/day	SpERC based
Air	0 kg/day	SpERC based
Soil	0 kg/day	SpERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.003 mg/L	0.028
Sea water	2.783 X 10^{-4} mg/L	0.028
Sewage treatment plant	0.025 mg/L	< 0.01
Man via Environment - Inhalation	2.913 X 10^{-11} mg/m^3	< 0.01
Man via Environment - Oral	8.144 X 10^{-5} mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m^3	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m^3	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m^3	<0.01
Inhalation, Local effects, Acute	0.04 mg/m^3	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01

Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01

Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.28 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.362
Combined routes, Systemic effects, Acute	-	< 0.01

Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 12: Consumer cosmetics, pharmaceuticals and personal care products

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC29 Pharmaceuticals PC39 Cosmetics, personal care products
Contributing scenario controlling environmental exposure	ERC8e, ERC8b Consumer use
Contributing scenario controlling consumer exposure	PC39 Cosmetics, personal care products PC29 Pharmaceuticals
Subsequent service life exposure scenario(s)	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8e Consumer use	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 8.25 X 10^{-5} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^{3} m^{3}/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^{4} m^{3}/days
Contributing scenario controlling consumer exposure (1) PC39 Cosmetics, personal care products	
Product (article) characteristic	
Product/ Article subcategory	No value
Contributing scenario controlling consumer exposure (2) PC29 Pharmaceuticals	
Product (article) characteristic	
Product/ Article subcategory	No value
Section 3: Exposure estimation and reference to its source	
Contributing scenario controlling environmental exposure (1) ERC8e Consumer use	

Release route	Release rate	Release estimation method
Water	0.002 kg/day	ERC based
Air	8.25 X 10^{-5} kg/day	ERC based
Soil	8.25 X 10^{-4} kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.744 X 10^{-4} mg/L	<0.01
Sea water	2.625 X 10^{-5} mg/L	<0.01
Sewage treatment plant	1.044 X 10^{-4} mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.289 X 10^{-5} mg/kg bw/day	<0.01
Contributing scenario controlling consumer exposure (1) PC39 Cosmetics, personal care products		
Not available		
Contributing scenario controlling consumer exposure (2) PC29 Pharmaceuticals		
Not available		
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 13: Formulation - dyestuffs and textiles use

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC23 Leather tanning, dye, finishing, impregnation and care products PC26 Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC34 Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Contributing scenario controlling environmental exposure	ERC2 Formulation of preparations
Contributing scenario controlling worker exposure	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations PROC15 Use as laboratory reagent

Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure

Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low

Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)

Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations	

Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]

Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	One hand face only (240 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations		
Release route	**Release rate**	**Release estimation method**
Water	14 kg/day	ERC based
Air	17.5 kg/day	ERC based
Soil	0.07 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.089 mg/L	0.889
Sea water	0.009 mg/L	0.889
Sewage treatment plant	0.886 mg/L	0.295
Man via Environment - Inhalation	0.003 mg/m^3	< 0.01
Man via Environment - Oral	0.417 mg/kg bw/day	0.07
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m^3	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m^3	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m^3	<0.01
Inhalation, Local effects, Acute	0.04 mg/m^3	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**

Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016

Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic	-	0.704

effects, Long Term		
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.362
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 14: Use at industrial sites of dyestuffs and in textiles uses

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC23 Leather tanning, dye, finishing, impregnation and care products PC26 Paper and board dye, finishing and impregnation products: including bleaches and other processing aids PC34 Textile dyes, finishing and impregnating products; including bleaches and other processing aids
Sectors of use [SU]	SU5 Manufacture of textiles, leather, fur SU6b Manufacture of pulp, paper and paper products
Contributing scenario controlling environmental exposure	ERC6b Use at industrial site
Contributing scenario controlling worker exposure	PROC2 Application of dyestuffs in closed system with occasional controlled exposure PROC8b Raw material receipt and transfer PROC5 Preparation of dyestuffs application PROC8a Batch loading of equipment (manual, non dedicated) PROC7 Spray coating- any technique PROC10 Brushing, roller, spreader, flow coating or printing- any technique PROC13 Treatment of articles by dipping and pouring PROC2 Curing and drying processes after application- elevated temperature PROC8a Manual cleaning and maintenance of equipment

Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC6b Use at industrial site	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC2 Application of dyestuffs in closed system with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (2) PROC8b Raw material receipt and transfer	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (3) PROC5 Preparation of dyestuffs application	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in	>25%

mixture	
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8a Batch loading of equipment (manual, non dedicated)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]

Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC7 Spray coating- any technique	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	No.
Local exhaust ventilation	Yes [Effectiveness - Inhalation: 95%]
Local exhaust ventilation (Dermal)	Yes [Effectiveness - Dermal: 95%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands and upper wrists (1500 cm^2)
Contributing scenario controlling worker exposure (6) PROC10 Brushing, roller, spreader, flow coating or printing- any technique	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (7) PROC13 Treatment of articles by dipping and pouring	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	

Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (8) PROC2 Curing and drying processes after application- elevated temperature	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (9) PROC8a Manual cleaning and maintenance of equipment	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	

General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC6b Use at industrial site		
Release route	**Release rate**	**Release estimation method**
Water	14 kg/day	Release factor
Air	0.7 kg/day	Release factor
Soil	0.175 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.089 mg/L	0.889
Sea water	0.009 mg/L	0.889
Sewage treatment plant	0.886 mg/L	0.295
Man via Environment - Inhalation	1.142 X 10^{-4} mg/m³	< 0.01
Man via Environment - Oral	0.018 mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC2 Application of dyestuffs in closed system with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.04 mg/m³	< 0.01

Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (2) PROC8b Raw material receipt and transfer		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (3) PROC5 Preparation of dyestuffs application		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.35 mg/m³	0.066
Inhalation, Systemic effects, Acute	1.4 mg/m³	0.013
Inhalation, Local effects, Long Term	0.35 mg/m³	0.011
Inhalation, Local effects, Acute	1.4 mg/m³	0.013
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.751

Combined routes, Systemic effects, Acute	-	0.013
Contributing scenario controlling worker exposure (4) PROC8a Batch loading of equipment (manual, non dedicated)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (5) PROC7 Spray coating- any technique		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.035 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.14 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.035 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.14 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.107 mg/kg bw/day	0.054
Dermal, Local effects, Long Term	0.005 mg/cm^2	< 0.01
Combined routes, Systemic effects, Long Term	-	0.06
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (6) PROC10 Brushing, roller, spreader, flow coating or printing- any technique		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC13 Treatment of articles by dipping and pouring		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (8) PROC2 Curing and drying processes after application- elevated temperature		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01

Inhalation, Local effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (9) PROC8a Manual cleaning and maintenance of equipment		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 15: Formulation - construction products

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC0 Other
Contributing scenario controlling environmental exposure	ERC2 Formulation of preparations
Contributing scenario controlling worker exposure	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC9 Filling small containers in dedicated lines PROC8a Maintenance and cleaning operations PROC15 Use as laboratory reagent
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in	Substance as such

mixture	
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	

Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in	Substance as such

mixture	
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	

Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in	Substance as such

mixture		
Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	One hand face only (240 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations		
Release route	**Release rate**	**Release estimation method**
Water	14 kg/day	ERC based
Air	17.5 kg/day	ERC based
Soil	0.07 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.089 mg/L	0.889
Sea water	0.009 mg/L	0.889
Sewage treatment plant	0.886 mg/L	0.295
Man via Environment - Inhalation	0.003 mg/m³	< 0.01
Man via Environment - Oral	0.417 mg/kg bw/day	0.07
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects,	0.01 mg/m³	<0.01

Long Term		
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019

Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053

Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (8) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.28 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (9) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.362
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 16: Use at industrial sites in construction products

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC0 Other
Sectors of use [SU]	SU19 Building and construction work
Contributing scenario controlling environmental exposure	ERC7 Use at industrial site
Contributing scenario controlling worker exposure	PROC8b Raw material receipt and transfer PROC3 Use in closed batch process (synthesis or formulation) PROC2 Use in closed, continuous process with occasional controlled exposure PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC6 Calendering operations PROC8a Transfer in non-dedicated facilities PROC8a Maintenance and cleaning operations
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC7 Use at industrial site	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8b Raw material receipt and transfer	

Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC3 Use in closed batch process (synthesis or formulation)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (3) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	

Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (5) PROC6 Calendering operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (6) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (7) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low

Concentration of substance in mixture	>25%	
Solid in solid mixtures	Yes	
Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC7 Use at industrial site		
Release route	**Release rate**	**Release estimation method**
Water	14 kg/day	Release factor
Air	0.7 kg/day	Release factor
Soil	35 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.089 mg/L	0.889
Sea water	0.009 mg/L	0.889
Sewage treatment plant	0.886 mg/L	0.295
Man via Environment - Inhalation	1.142 X 10^{-4} mg/m^3	< 0.01
Man via Environment - Oral	0.018 mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC8b Raw material receipt and transfer		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.28 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.699
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (2) PROC3 Use in closed batch process (synthesis or formulation)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (3) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (4) PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (5) PROC6 Calendering operations		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (6) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 17: Professional creation of building materials and articles

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC0 Other
Sectors of use [SU]	SU19 Building and construction work
Contributing scenario controlling environmental exposure	ERC 8f, ERC 8c Professional use of building materials and articles creation
Contributing scenario controlling worker exposure	PROC8a Transfer in non-dedicated facilities PROC5 Mixing operations PROC14 Article preparation PROC24 High energy processing PROC8a Maintenance and cleaning operations
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC 8f Professional use of building materials and articles creation	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 8.25 X 10^{-5} tonnes/day
Percentage of tonnage used at regional scale	10%

Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC5 Mixing operations	
Product (article) characteristic	

Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (3) PROC14 Article preparation	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	

Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC24 High energy processing	
Product (article) characteristic	
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature > melting point
Skin surface potentially exposed	Two hands and forearms (1980 cm^2)
Contributing scenario controlling worker exposure (5) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes

Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC 8f Professional use of building materials and articles creation		
Release route	**Release rate**	**Release estimation method**
Water	8.25 X 10^{-4} kg/day	ERC based
Air	0.012 kg/day	ERC based
Soil	4.125 X 10^{-4} kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.692 X 10^{-4} mg/L	< 0.01
Sea water	2.573 X 10^{-5} mg/L	< 0.01
Sewage treatment plant	5.221 X 10^{-5} mg/L	< 0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m^3	< 0.01
Man via Environment - Oral	7.287 X 10^{-5} mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (2) PROC5 Mixing operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.188
Inhalation, Systemic effects, Acute	4 mg/m³	0.038
Inhalation, Local effects, Long Term	1 mg/m³	0.031
Inhalation, Local effects, Acute	4 mg/m³	0.038
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.873
Combined routes, Systemic effects, Acute	-	0.038
Contributing scenario controlling worker exposure (3) PROC14 Article preparation		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	1 mg/m³	0.188
Inhalation, Systemic effects, Acute	4 mg/m³	0.038
Inhalation, Local effects, Long Term	1 mg/m³	0.031
Inhalation, Local effects, Acute	4 mg/m³	0.038
Dermal, Systemic effects, Long Term	0.343 mg/kg bw/day	0.172
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.359
Combined routes, Systemic effects, Acute	-	0.038
Contributing scenario controlling worker exposure (4) PROC24 High energy processing		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	2 mg/m³	0.375
Inhalation, Systemic effects, Acute	8 mg/m³	0.077
Inhalation, Local effects, Long Term	2 mg/m³	0.062
Inhalation, Local effects, Acute	8 mg/m³	0.077
Dermal, Systemic effects, Long Term	0.283 mg/kg bw/day	0.142
Dermal, Local effects, Long Term	0.01 mg/cm^2	0.01
Combined routes, Systemic effects, Long Term	-	0.517
Combined routes, Systemic effects, Acute	-	0.077
Contributing scenario controlling worker exposure (5) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 18: Consumer building product use

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC0 Other
Contributing scenario controlling environmental exposure	ERC8f, ERC8c Consumer building product use
Contributing scenario controlling consumer exposure	PC0 Use of building products
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8f Consumer building product use	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 8.25 X 10^{-5} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days

Application of the STP sludge on agricultural soil	Yes	
Conditions and measures related to external treatment of waste for disposal		
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)		
Other given operational conditions affecting environmental exposure		
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days	
Contributing scenario controlling consumer exposure (1) PC0 Use of building products		
Product (article) characteristic		
Product/ Article subcategory	No value	
Concentration of substance in mixture	0.1 g/g	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC8f Consumer building product use		
Release route	**Release rate**	**Release estimation method**
Water	8.25 X 10^{-4} kg/day	ERC based
Air	0.012 kg/day	ERC based
Soil	4.125 X 10^{-4} kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.692 X 10^{-4} mg/L	<0.01
Sea water	2.573 X 10^{-5} mg/L	<0.01
Sewage treatment plant	5.221 X 10^{-5} mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.287 X 10^{-5} mg/kg bw/day	<0.01
Contributing scenario controlling consumer exposure (1) PC0 Use of building products		
Not available		
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 19: Formulation - Coatings and Inks

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC9a Coatings and paints, thinners, paint removers PC14 Metal surface treatment products, including galvanic and electroplating products PC18 Ink and toners
Contributing scenario controlling environmental exposure	ERC2 Formulation of preparations
Contributing scenario controlling worker exposure	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b Receiving and charging of the substance PROC3 Mixing, dispersing, completion in closed batch process PROC5 Mixing, dispersing and completion in open multistage batch process PROC9 Filling small containers in dedicated lines PROC8a Transfer in non-dedicated facilities PROC8b Transfer at dedicated facilities PROC8a Maintenance and cleaning operations PROC15 Use as laboratory reagent
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure	

Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Use in closed systems. (minimal contact during routine operations)
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]

Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)

Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed batch process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	One hand face only (240 cm^2)

Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (7) PROC9 Filling small containers in dedicated lines	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (8) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature < melting point
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (9) PROC8b Transfer at dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Good general ventilation (3-5 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	Two hands (960 cm^2)	
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Product (article) characteristic		
Dustiness of material	Low	
Concentration of substance in mixture	Substance as such	
Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 80%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Elevated temperature < melting point	
Skin surface potentially exposed	One hand face only (240 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC2 Formulation of preparations		
Release route	**Release rate**	**Release estimation method**
Water	7 kg/day	Release factor
Air	4.2 kg/day	Release factor
Soil	0 kg/day	Release factor
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.045 mg/L	0.446
Sea water	0.004 mg/L	0.446
Sewage treatment plant	0.443 mg/L	0.148
Man via Environment - Inhalation	6.855 X 10^{-4} mg/m³	< 0.01

Man via Environment - Oral	0.101 mg/kg bw/day	0.017
Contributing scenario controlling worker exposure (1) PROC1 Use in closed process, no likelihood of exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.007 mg/kg bw/day	<0.01
Dermal, Local effects, Long Term	0.002 mg/cm^2	<0.01
Combined routes, Systemic effects, Long Term	-	<0.01
Combined routes, Systemic effects, Acute	-	<0.01
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	<0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	<0.01
Inhalation, Local effects, Acute	0.04 mg/m³	<0.01
Dermal, Systemic effects, Long Term	0.274 mg/kg bw/day	0.137
Dermal, Local effects, Long Term	0.04 mg/cm^2	0.04
Combined routes, Systemic effects, Long Term	-	0.139
Combined routes, Systemic effects, Acute	-	<0.01

Contributing scenario controlling worker exposure (3) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC8b Receiving and charging of the substance		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01

Contributing scenario controlling worker exposure (5) PROC3 Mixing, dispersing, completion in closed batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.069 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (6) PROC5 Mixing, dispersing and completion in open multistage batch process		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (7) PROC9 Filling small containers in dedicated lines		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.362
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (8) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (9) PROC8b Transfer at dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.07 mg/m³	0.013
Inhalation, Systemic effects, Acute	0.28 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.07 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.28 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.356
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (10) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (11) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.068 mg/kg bw/day	0.034
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.053
Combined routes, Systemic effects, Acute	-	< 0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 20: Use at industrial site - General Industrial use of coatings and inks

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC9a Coatings and paints, thinners, paint removers PC14 Metal surface treatment products, including galvanic and electroplating products PC18 Ink and toners
Sectors of use [SU]	SU6b Manufacture of pulp, paper and paper products SU7 Printing and reproduction of recorded media SU16 Manufacture of computer, electronic and optical products, electrical equipment SU17 General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment
Contributing scenario controlling environmental exposure	ERC5 Industrial use of coatings and inks involving water ERC5 Industrial use of coatings and inks water-free
Contributing scenario controlling worker exposure	PROC2 Application of coating and inks in closed system with occasional controlled exposure PROC8b Raw material receipt and transfer PROC5 Preparation of coating and inks application PROC8a Batch loading of equipment (manual, non dedicated) PROC7 Spray coating- any technique PROC10 Brushing, roller, spreader, flow coating or printing- any technique PROC13 Treatment of articles by dipping and pouring PROC2 Curing and drying processes after application- elevated temperature PROC8a Manual cleaning and maintenance of equipment

Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC5 Industrial use of coatings and inks involving water	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 100%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling environmental exposure (2) ERC5 Industrial use of coatings and inks water-free	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.1 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes

Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC2 Application of coatings and inks in closed system with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (2) PROC8b Raw material receipt and transfer	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (3) PROC5 Preparation of coatings and inks application	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC8a Batch loading of equipment (manual, non dedicated)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (5) PROC7 Spray coating- any technique	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	Yes [Effectiveness - Inhalation: 95%]
Local exhaust ventilation (Dermal)	Yes [Effectiveness - Dermal: 95%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands and upper wrists (1500 cm^2)
Contributing scenario controlling worker exposure (6) PROC10 Brushing, roller, spreader, flow coating or printing- any technique	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 95%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]

Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (7) PROC13 Treatment of articles by dipping and pouring	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (8) PROC2 Curing and drying processes after application- elevated temperature	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes

Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (9) PROC8a Manual cleaning and maintenance of equipment	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield

Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC5 Industrial use of coatings and inks involving water		
Release route	**Release rate**	**Release estimation method**
Water	0 kg/day	SpERC based
Air	11.9 kg/day	SpERC based
Soil	0 kg/day	SpERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.64 X 10^{-4} mg/L	< 0.01
Sea water	2.521 X 10^{-5} mg/L	< 0.01
Sewage treatment plant	0 mg/L	< 0.01
Man via Environment - Inhalation	0.002 mg/m^3	< 0.01
Man via Environment - Oral	0.283 mg/kg bw/day	0.047
Contributing scenario controlling environmental exposure (2) ERC5 Industrial use of coatings and inks water-free		
Release route	**Release rate**	**Release estimation method**
Water	0.3 kg/day	SpERC based
Air	0 kg/day	SpERC based
Soil	0 kg/day	SpERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.002 mg/L	0.022
Sea water	2.151 X 10^{-4} mg/L	0.022
Sewage treatment plant	0.019 mg/L	< 0.01
Man via Environment - Inhalation	2.919 X 10^{-11} mg/m^3	< 0.01
Man via Environment - Oral	2.652 X 10^{-4} mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC2 Application of coating and inks in closed system with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m^3	< 0.01

Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (2) PROC8b Raw material receipt and transfer		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.06 mg/m³	0.011
Inhalation, Systemic effects, Acute	0.24 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.06 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.24 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.823 mg/kg bw/day	0.411
Dermal, Local effects, Long Term	0.06 mg/cm^2	0.06
Combined routes, Systemic effects, Long Term	-	0.423
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (3) PROC5 Preparation of coating and inks application		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects,	1.371 mg/kg bw/day	0.686

Long Term		
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC8a Batch loading of equipment (manual, non dedicated)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (5) PROC7 Spray coating- any technique		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.05 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.2 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.05 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.2 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.107 mg/kg bw/day	0.054
Dermal, Local effects, Long Term	0.005 mg/cm^2	< 0.01
Combined routes, Systemic effects, Long Term	-	0.063

Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (6) PROC10 Brushing, roller, spreader, flow coating or printing- any technique		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.372 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.78
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (7) PROC13 Treatment of articles by dipping and pouring		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (8) PROC2 Curing and drying processes after application- elevated temperature		

Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (9) PROC8a Manual cleaning and maintenance of equipment		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.

Exposure Scenario 21: Industrial use of Metal Treatment Products

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC9a Coatings and paints, thinners, paint removers PC14 Metal surface treatment products, including galvanic and electroplating products PC18 Ink and toners
Contributing scenario controlling environmental exposure	ERC5 Industrial use of Metal Treatment Products
Contributing scenario controlling worker exposure	PROC2 Application of metal surface treatment in closed systems with occasional exposure PROC8a Batch loading of equipment (manual, non dedicated) PROC8b Raw material receipt and transfer PROC13 Treatment of articles by dipping and pouring PROC8a Manual cleaning and maintenance of equipment
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC5 Industrial use of Metal Treatment Products	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.05 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	100%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Chemical waste - discontinuous generation	Spent process fluid to be disposed of as chemical waste
Chemical waste - continuous generation	Spent fluid discharged to wastewater

On site treatment of wastewater	pH adjustment and subsequent filtration/sedimentation - Ni salts [Effectiveness - Water: 95%]
Contributing scenario controlling worker exposure (1) PROC2 Application of metal surface treatment in closed systems with occasional exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (2) PROC8a Batch loading of equipment (manual, non dedicated)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.

Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (3) PROC8b Raw material receipt and transfer	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)

Contributing scenario controlling worker exposure (4) PROC13 Treatment of articles by dipping and pouring	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (5) PROC8a Manual cleaning and maintenance of equipment	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.

Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC5 Industrial use of Metal Treatment Products		
Release route	**Release rate**	**Release estimation method**
Water	0.125 kg/day	SpERC based
Air	0 kg/day	SpERC based
Soil	0 kg/day	SpERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.001 mg/L	0.011
Sea water	1.043 X 10^{-4} mg/L	0.01
Sewage treatment plant	0.008 mg/L	< 0.01
Man via Environment - Inhalation	2.918 X 10^{-11} mg/m^3	< 0.01
Man via Environment - Oral	2.246 X 10^{-4} mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC2 Application of metal surface treatment in closed systems with occasional exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m^3	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m^3	< 0.01
Inhalation, Local effects, Long Term	0.01 mg/m^3	< 0.01
Inhalation, Local effects, Acute	0.04 mg/m^3	< 0.01
Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068

Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (2) PROC8a Batch loading of equipment (manual, non dedicated)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (3) PROC8b Raw material receipt and transfer		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.06 mg/m³	0.011
Inhalation, Systemic effects, Acute	0.24 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.06 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.24 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.823 mg/kg bw/day	0.411
Dermal, Local effects, Long Term	0.06 mg/cm^2	0.06
Combined routes, Systemic effects, Long Term	-	0.423
Combined routes, Systemic effects, Acute	-	< 0.01

Contributing scenario controlling worker exposure (4) PROC13 Treatment of articles by dipping and pouring		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (5) PROC8a Manual cleaning and maintenance of equipment		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.

Exposure Scenario 22: Professional painting and coatings

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC9a Coatings and paints, thinners, paint removers PC14 Metal surface treatment products, including galvanic and electroplating products PC18 Ink and toners
Sectors of use [SU]	SU15 Manufacture of fabricated metal products, except machinery and equipment SU17 General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU19 Building and construction work SU0 Other
Contributing scenario controlling environmental exposure	ERC8f, ERC8c Use leading to inclusion into/onto matrix
Contributing scenario controlling worker exposure	PROC8a Transfer in non-dedicated facilities PROC10 Roller application or brushing PROC11 Non industrial spraying
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8f Use leading to inclusion into/onto matrix	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 5.5 X 10^{-6} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^{3} m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^{4} m^3/days

Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC10 Roller application or brushing	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<4 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]

Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (3) PROC11 Non industrial spraying	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<1 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands and upper wrists (1500 cm^2)
Section 3: Exposure estimation and reference to its source	
Contributing scenario controlling environmental exposure (1) ERC8f Use leading to inclusion into/onto matrix	

Release route	Release rate	Release estimation method
Water	5.5 X 10^{-4} kg/day	ERC based
Air	0.008 kg/day	ERC based
Soil	2.75 X 10^{-4} kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.675 X 10^{-4} mg/L	< 0.01
Sea water	2.556 X 10^{-5} mg/L	< 0.01
Sewage treatment plant	3.481 X 10^{-5} mg/L	< 0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	< 0.01
Man via Environment - Oral	7.286 X 10^{-5} mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.3 mg/m³	0.056
Inhalation, Systemic effects, Acute	1.2 mg/m³	0.012
Inhalation, Local effects, Long Term	0.3 mg/m³	< 0.01
Inhalation, Local effects, Acute	1.2 mg/m³	0.012
Dermal, Systemic effects, Long Term	0.823 mg/kg bw/day	0.411
Dermal, Local effects, Long Term	0.06 mg/cm^2	0.06
Combined routes, Systemic effects, Long Term	-	0.468
Combined routes, Systemic effects, Acute	-	0.012
Contributing scenario controlling worker exposure (2) PROC10 Roller application or brushing		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.18 mg/m³	0.034
Inhalation, Systemic effects, Acute	1.2 mg/m³	0.012
Inhalation, Local effects, Long Term	0.18 mg/m³	< 0.01
Inhalation, Local effects, Acute	1.2 mg/m³	0.012
Dermal, Systemic effects, Long Term	0.988 mg/kg bw/day	0.494
Dermal, Local effects, Long Term	0.072 mg/cm^2	0.072
Combined routes, Systemic effects, Long Term	-	0.528
Combined routes, Systemic effects, Acute	-	0.012
Contributing scenario controlling worker exposure (3) PROC11 Non industrial spraying		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.12 mg/m³	0.023
Inhalation, Systemic effects, Acute	2.4 mg/m³	0.023
Inhalation, Local effects, Long Term	0.12 mg/m³	< 0.01
Inhalation, Local effects, Acute	2.4 mg/m³	0.023
Dermal, Systemic effects, Long Term	1.286 mg/kg bw/day	0.643
Dermal, Local effects, Long Term	0.06 mg/cm^2	0.06
Combined routes, Systemic effects, Long Term	-	0.665
Combined routes, Systemic effects, Acute	-	0.023
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 23: Consumer painting and coatings

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC9a Coatings and paints, thinners, paint removers PC14 Metal surface treatment products, including galvanic and electroplating products PC18 Ink and toners
Contributing scenario controlling environmental exposure	ERC8f, ERC8c Use leading to inclusion into/onto matrix
Contributing scenario controlling consumer exposure	PC9a Use in water born wall paints, roller and brush application PC9a Use in rich solvent paints, roller and brush application PC14 Metal surface treatments (general) PC38 Welding and Flux products
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8f Use leading to inclusion into/onto matrix	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 2.75 X 10^{-5} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^{3} m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^{4} m^3/days
Contributing scenario controlling consumer exposure (1) PC9a Use in water born wall paints, roller and brush application	
Product (article) characteristic	
Product/ Article subcategory	Solvent rich, high solid, water borne paint
Spray	No.
Concentration of substance in mixture	0.05 g/g
Oral contact foreseen	No.

Amounts used, Frequency and duration of use		
Amount of product used per application	1.3 X 10^3 g/event	
Exposure time	2.2 hour(s)	
Frequency of use	1 event/day	
Other conditions affecting consumers exposure		
Body parts potentially exposed	Inside hands / one hand / palm of hands	
Dermal transfer factor	1	
Contributing scenario controlling consumer exposure (2) PC9a Use in rich solvent paints, roller and brush application		
Product (article) characteristic		
Product/ Article subcategory	Solvent rich, high solid, water borne paint	
Spray	No.	
Concentration of substance in mixture	0.05 g/g	
Oral contact foreseen	No.	
Amounts used, Frequency and duration of use		
Amount of product used per application	1 X 10^3 g/event	
Exposure time	2.2 hour(s)	
Frequency of use	1 event/day	
Other conditions affecting consumers exposure		
Body parts potentially exposed	Inside hands / one hand / palm of hands	
Dermal transfer factor	1	
Contributing scenario controlling consumer exposure (3) PC14 Metal surface treatments (general)		
Product (article) characteristic		
Product/ Article subcategory	No value	
Contributing scenario controlling consumer exposure (4) PC38 Welding and Flux products		
Product (article) characteristic		
Product/ Article subcategory	No value	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC8f Use leading to inclusion into/onto matrix		
Release route	**Release rate**	**Release estimation method**
Water	2.75 X 10^{-4} kg/day	ERC based
Air	0.004 kg/day	ERC based
Soil	1.375 X 10^{-4} kg/day	ERC based

Protection target	Exposure estimation	Risk characterisation ratio
Fresh water	2.657 X 10^{-4} mg/L	<0.01
Sea water	2.538 X 10^{-5} mg/L	<0.01
Sewage treatment plant	1.74 X 10^{-5} mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.285 X 10^{-5} mg/kg bw/day	<0.01
Contributing scenario controlling consumer exposure (1) PC9a Use in water born wall paints, roller and brush application		
Method: TRA Consumer v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.022 mg/m³	0.014
Inhalation, Local effects, Long Term	0.022 mg/m³	0.014
Dermal, Systemic effects, Long Term	3.573 mg/kg bw/day	0.596
Oral, Systemic effects, Long Term	0 mg/kg bw/day	< 0.01
Combined routes, Systemic effects, Long Term	-	0.609
Contributing scenario controlling consumer exposure (2) PC9a Use in rich solvent paints, roller and brush application		
Method: TRA Consumer v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.022 mg/m³	0.014
Inhalation, Local effects, Long Term	0.022 mg/m³	0.014
Dermal, Systemic effects, Long Term	3.573 mg/kg bw/day	0.596
Oral, Systemic effects, Long Term	0 mg/kg bw/day	< 0.01
Combined routes, Systemic effects, Long Term	-	0.609
Contributing scenario controlling consumer exposure (3) PC14 Metal surface treatments (general)		
Not available		
Contributing scenario controlling consumer exposure (4)		

PC38 Welding and Flux products
Not available
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.

Exposure Scenario 24: General industrial use in production of polymers and resins

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC32 Polymer preparations and compounds
Sectors of use [SU]	SU11 Manufacture of rubber products SU12 Manufacture of plastics products, including compounding and conversion
Contributing scenario controlling environmental exposure	ERC5 General industrial use in production of polymers and resins
Contributing scenario controlling worker exposure	PROC8b Raw material receipt and transfer PROC5 Preparation of polymers and resins PROC14 Polymer compounding PROC24 Polymer compounding (high energy) PROC8a Batch loading of equipment (manual, non dedicated) PROC8a Manual cleaning and maintenance of equipment
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC5 General industrial use in production of polymers and resins	
Amounts used, Frequency and duration of use	
Daily use at site	≤ 0.7 tonnes/day
Annual use at site	≤ 150 tonnes/year
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	

Receiving surface water flow	≥ 1.8 X 10^4 m^3/days
Contributing scenario controlling worker exposure (1) PROC8b Raw material receipt and transfer	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC5 Preparation of polymers and resins	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC14 Polymer compounding	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC24 Polymer compounding (high energy)	
Product (article) characteristic	
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	

Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	Yes [Effectiveness - Inhalation: 80%]
Local exhaust ventilation (Dermal)	No. [Effectiveness - Dermal: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Elevated temperature > melting point
Skin surface potentially exposed	Two hands and forearms (1980 cm^2)
Contributing scenario controlling worker exposure (5) PROC8a Batch loading of equipment (manual, non dedicated)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use

Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Contributing scenario controlling worker exposure (6) PROC8a Manual cleaning and maintenance of equipment		
Product (article) characteristic		
Dustiness of material	Low	
Concentration of substance in mixture	Substance as such	
Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Advanced	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC5 General industrial use in production of polymers and resins		
Release route	**Release rate**	**Release estimation method**
Water	14 kg/day	Release factor
Air	0.7 kg/day	Release factor
Soil	7 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	0.089 mg/L	0.889
Sea water	0.009 mg/L	0.889
Sewage treatment plant	0.886 mg/L	0.295
Man via Environment - Inhalation	1.142 X 10^{-4} mg/m³	< 0.01

Man via Environment - Oral	0.018 mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC8b Raw material receipt and transfer		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm²	0.1
Combined routes, Systemic effects, Long Term	-	0.704
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (2) PROC5 Preparation of polymers and resins		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm²	0.2
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (3) PROC14 Polymer compounding		
Method: TRA Worker v3		

Route of exposure and type of effects	Exposure concentration	Risk characterisation ratio
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.343 mg/kg bw/day	0.172
Dermal, Local effects, Long Term	0.05 mg/cm^2	0.05
Combined routes, Systemic effects, Long Term	-	0.19
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (4) PROC24 Polymer compounding (high energy)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	2 mg/m³	0.375
Inhalation, Systemic effects, Acute	8 mg/m³	0.077
Inhalation, Local effects, Long Term	2 mg/m³	0.062
Inhalation, Local effects, Acute	8 mg/m³	0.077
Dermal, Systemic effects, Long Term	0.283 mg/kg bw/day	0.142
Dermal, Local effects, Long Term	0.01 mg/cm^2	0.01
Combined routes, Systemic effects, Long Term	-	0.517
Combined routes, Systemic effects, Acute	-	0.077
Contributing scenario controlling worker exposure (5) PROC8a Batch loading of equipment (manual, non dedicated)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019

Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (6) PROC8a Manual cleaning and maintenance of equipment		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 25: Professional use of resins

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC32 Polymer preparations and compounds
Sectors of use [SU]	SU10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys) SU11 Manufacture of rubber products SU12 Manufacture of plastics products, including compounding and conversion SU19 Building and construction work
Contributing scenario controlling environmental exposure	ERC8f, ERC8c Professional use of resins
Contributing scenario controlling	PROC8a Transfer in non-dedicated facilities

worker exposure	PROC5 Mixing (general) PROC11 Non industrial spraying PROC10 Roller application or brushing
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8f Professional use of resins	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 5.5 X 10^{-5} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^{3} m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^{4} m^3/days
Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety	Basic

Management System	
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands (960 cm^2)
Contributing scenario controlling worker exposure (2) PROC5 Mixing (general)	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	>25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC11 Non industrial spraying	
Product (article) characteristic	
Dustiness of material	Low

Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<1 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands and upper wrists (1500 cm^2)
Contributing scenario controlling worker exposure (4) PROC10 Roller application or brushing	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	5-25%
Solid in solid mixtures	Yes
Amounts used, Frequency and duration of use	
Duration of activity	<4 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]

Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC8f Professional use of resins		
Release route	**Release rate**	**Release estimation method**
Water	5.5 X 10^{-4} kg/day	ERC based
Air	0.008 kg/day	ERC based
Soil	2.75 X 10^{-4} kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.675 X 10^{-4} mg/L	< 0.01
Sea water	2.556 X 10^{-5} mg/L	< 0.01
Sewage treatment plant	3.481 X 10^{-5} mg/L	< 0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m^3	< 0.01
Man via Environment - Oral	7.286 X 10^{-5} mg/kg bw/day	< 0.01
Contributing scenario controlling worker exposure (1) PROC8a Transfer in non-dedicated facilities		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m^3	0.094
Inhalation, Systemic effects, Acute	2 mg/m^3	0.019
Inhalation, Local effects, Long Term	0.5 mg/m^3	0.016
Inhalation, Local effects, Acute	2 mg/m^3	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic effects, Acute	-	0.019

Contributing scenario controlling worker exposure (2) PROC5 Mixing (general)		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	1 mg/m³	0.188
Inhalation, Systemic effects, Acute	4 mg/m³	0.038
Inhalation, Local effects, Long Term	1 mg/m³	0.031
Inhalation, Local effects, Acute	4 mg/m³	0.038
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.2 mg/cm^2	0.2
Combined routes, Systemic effects, Long Term	-	0.873
Combined routes, Systemic effects, Acute	-	0.038
Contributing scenario controlling worker exposure (3) PROC11 Non industrial spraying		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.12 mg/m³	0.023
Inhalation, Systemic effects, Acute	2.4 mg/m³	0.023
Inhalation, Local effects, Long Term	0.12 mg/m³	< 0.01
Inhalation, Local effects, Acute	2.4 mg/m³	0.023
Dermal, Systemic effects, Long Term	1.286 mg/kg bw/day	0.643
Dermal, Local effects, Long Term	0.06 mg/cm^2	0.06
Combined routes, Systemic effects, Long Term	-	0.665
Combined routes, Systemic effects, Acute	-	0.023
Contributing scenario controlling worker exposure (4) PROC10 Roller application or brushing		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**

Inhalation, Systemic effects, Long Term	0.18 mg/m³	0.034
Inhalation, Systemic effects, Acute	1.2 mg/m³	0.012
Inhalation, Local effects, Long Term	0.18 mg/m³	< 0.01
Inhalation, Local effects, Acute	1.2 mg/m³	0.012
Dermal, Systemic effects, Long Term	0.988 mg/kg bw/day	0.494
Dermal, Local effects, Long Term	0.072 mg/cm^2	0.072
Combined routes, Systemic effects, Long Term	-	0.528
Combined routes, Systemic effects, Acute	-	0.012
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 26: Consumer resin use

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC32 Polymer preparations and compounds
Contributing scenario controlling environmental exposure	ERC8f, ERC8c Consumer resin use
Contributing scenario controlling consumer exposure	PC32 Use of resins PC1 Adhesives, sealants
Subsequent service life exposure scenario(s)	ES 25 Service life (professional worker); Service life articles used by workers; SU 5; SU 6b; SU 11; SU 12; SU 13; SU 16; SU 17; SU 18; SU 19; SU 0
	ES 26 Service life (consumers); Service life articles used by consumers
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC8f Consumer resin use	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 2.75 X 10^{-5} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^3 m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	

Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)		
Other given operational conditions affecting environmental exposure		
Receiving surface water flow	≥ 1.8 X 10^4 m^3/days	
Contributing scenario controlling consumer exposure (1) PC32 Use of resins		
Product (article) characteristic		
Product/ Article subcategory	No value	
Contributing scenario controlling consumer exposure (2) PC1 Adhesives, sealants		
Product (article) characteristic		
Product/ Article subcategory	Glues DIY-use (carpet glue, tile glue, wood parquet glue)	
Concentration of substance in mixture	0.05 g/g	
Oral contact foreseen	No.	
Amounts used, Frequency and duration of use		
Amount of product used per application	10 g/event	
Exposure time	6 hour(s)	
Frequency of use	1 event/day	
Other conditions affecting consumers exposure		
Body parts potentially exposed	Inside hands / one hand / palm of hands	
Dermal transfer factor	1	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC8f Consumer resin use		
Release route	**Release rate**	**Release estimation method**
Water	2.75 X 10^{-4} kg/day	ERC based
Air	0.004 kg/day	ERC based
Soil	1.375 X 10^{-4} kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.657 X 10^{-4} mg/L	<0.01
Sea water	2.538 X 10^{-5} mg/L	<0.01
Sewage treatment plant	1.74 X 10^{-5} mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.285 X 10^{-5} mg/kg bw/day	<0.01
Contributing scenario controlling consumer exposure (1)		

PC32 Use of resins		
Not available		
Contributing scenario controlling consumer exposure (1) PC1 Adhesives, sealants		
Method: TRA Consumer v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.005 mg/m³	0.014
Inhalation, Local effects, Long Term	0.005 mg/m³	0.014
Dermal, Systemic effects, Long Term	3.573 mg/kg bw/day	0.596
Oral, Systemic effects, Long Term	0 mg/kg bw/day	< 0.01
Combined routes, Systemic effects, Long Term	-	0.609
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 27: Laboratory use (professional worker)

Section 1: Title of exposure scenario	
Chemical product category [PC]	PC20 Products such as ph-regulators, flocculants, precipitants, neutralization agents PC21 Laboratory chemicals
Sectors of use [SU]	SU5 Manufacture of textiles, leather, fur SU6b Manufacture of pulp, paper and paper products SU11 Manufacture of rubber products SU12 Manufacture of plastics products, including compounding and conversion SU13 Manufacture of other non-metallic mineral products, e.g. plasters, cement SU17 General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU19 Building and construction work SU24 Scientific research and development
Contributing scenario controlling environmental exposure	ERC8e, ERC8b Laboratory use (professional worker)
Contributing scenario controlling worker exposure	PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC2 Use in closed, continuous process with occasional controlled exposure PROC9 Transfer of substance or preparations in small containers PROC15 Use as laboratory reagent PROC8a Maintenance and cleaning operations
Section 2: Operational conditions of use	

Contributing scenario controlling environmental exposure (1) ERC8e Laboratory use (professional worker)	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 5.5 X 10^{-7} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^{3} m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^{4} m^3/days
Contributing scenario controlling worker exposure (1) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient

Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Closed continuous process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (3) PROC9 Transfer of substance or preparations in small containers	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	Semi-closed process with occasional controlled exposure
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic

Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	Two hands face (480 cm^2)
Contributing scenario controlling worker exposure (4) PROC15 Use as laboratory reagent	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such
Amounts used, Frequency and duration of use	
Duration of activity	<8 hour(s)
Technical conditions and measures to control dispersion from source towards the worker	
General ventilation	Basic general ventilation (1-3 air changes per hour)
Containment	No.
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]
Occupational Health and Safety Management System	Basic
Conditions and measures related to personal protection, hygiene and health evaluation	
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]
Respiratory protection	No. [Effectiveness - Inhalation: 0%]
Eye Protection	Safety spectacles/goggles/full face shield
Other given operational conditions affecting workers exposure	
Place of use	Indoor use
Process temperature (for solid)	Ambient
Skin surface potentially exposed	One hand face only (240 cm^2)
Contributing scenario controlling worker exposure (5) PROC8a Maintenance and cleaning operations	
Product (article) characteristic	
Dustiness of material	Low
Concentration of substance in mixture	Substance as such

Amounts used, Frequency and duration of use		
Duration of activity	<8 hour(s)	
Technical conditions and measures to control dispersion from source towards the worker		
General ventilation	Basic general ventilation (1-3 air changes per hour)	
Containment	No.	
Local exhaust ventilation	No. [Effectiveness - Inhalation: 0%]	
Occupational Health and Safety Management System	Basic	
Conditions and measures related to personal protection, hygiene and health evaluation		
Hand protection/ Skin protection	Wear impervious gloves (EN374). [Effectiveness - Dermal: 90%]	
Respiratory protection	No. [Effectiveness - Inhalation: 0%]	
Eye Protection	Safety spectacles/goggles/full face shield	
Other given operational conditions affecting workers exposure		
Place of use	Indoor use	
Process temperature (for solid)	Ambient	
Skin surface potentially exposed	Two hands (960 cm^2)	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC8e Laboratory use (professional worker)		
Release route	**Release rate**	**Release estimation method**
Water	1.1 X 10^{-5} kg/day	ERC based
Air	5.5 X 10^{-7} kg/day	ERC based
Soil	5.5 X 10^{-6} kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	2.641 X 10^{-4} mg/L	<0.01
Sea water	2.522 X 10^{-5} mg/L	<0.01
Sewage treatment plant	6.961 X 10^{-7} mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m^3	<0.01
Man via Environment - Oral	7.285 X 10^{-5} mg/kg bw/day	<0.01
Contributing scenario controlling worker exposure (1) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	1 mg/m^3	0.188

Inhalation, Systemic effects, Acute	4 mg/m³	0.038
Inhalation, Local effects, Long Term	1 mg/m³	0.031
Inhalation, Local effects, Acute	4 mg/m³	0.038
Dermal, Systemic effects, Long Term	0.686 mg/kg bw/day	0.343
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.531
Combined routes, Systemic effects, Acute	-	0.038
Contributing scenario controlling worker exposure (2) PROC2 Use in closed, continuous process with occasional controlled exposure		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Systemic effects, Acute	0.04 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.01 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.04 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.137 mg/kg bw/day	0.068
Dermal, Local effects, Long Term	0.02 mg/cm^2	0.02
Combined routes, Systemic effects, Long Term	-	0.07
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (3) PROC9 Transfer of substance or preparations in small containers		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects,	0.686 mg/kg bw/day	0.343

Long Term		
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.437
Combined routes, Systemic effects, Acute	-	0.019
Contributing scenario controlling worker exposure (4) PROC15 Use as laboratory reagent		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.1 mg/m³	0.019
Inhalation, Systemic effects, Acute	0.4 mg/m³	< 0.01
Inhalation, Local effects, Long Term	0.1 mg/m³	< 0.01
Inhalation, Local effects, Acute	0.4 mg/m³	< 0.01
Dermal, Systemic effects, Long Term	0.034 mg/kg bw/day	0.017
Dermal, Local effects, Long Term	0.01 mg/cm^2	< 0.01
Combined routes, Systemic effects, Long Term	-	0.036
Combined routes, Systemic effects, Acute	-	< 0.01
Contributing scenario controlling worker exposure (5) PROC8a Maintenance and cleaning operations		
Method: TRA Worker v3		
Route of exposure and type of effects	**Exposure concentration**	**Risk characterisation ratio**
Inhalation, Systemic effects, Long Term	0.5 mg/m³	0.094
Inhalation, Systemic effects, Acute	2 mg/m³	0.019
Inhalation, Local effects, Long Term	0.5 mg/m³	0.016
Inhalation, Local effects, Acute	2 mg/m³	0.019
Dermal, Systemic effects, Long Term	1.371 mg/kg bw/day	0.686
Dermal, Local effects, Long Term	0.1 mg/cm^2	0.1
Combined routes, Systemic effects, Long Term	-	0.779
Combined routes, Systemic	-	0.019

effects, Acute		
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 28: Service life articles used by workers

Section 1: Title of exposure scenario	
Sectors of use [SU]	SU5 Manufacture of textiles, leather, fur SU6b Manufacture of pulp, paper and paper products SU11 Manufacture of rubber products SU12 Manufacture of plastics products, including compounding and conversion SU13 Manufacture of other non-metallic mineral products, e.g. plasters, cement SU16 Manufacture of computer, electronic and optical products, electrical equipment SU17 General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU18 Manufacture of furniture SU19 Building and construction work SU0 Other
Article Categories [AC]	AC1 Vehicles AC2 Machinery, mechanical appliances, electrical/electronic articles AC4 Stone, plaster, cement, glass and ceramic articles AC5 Fabrics, textiles and apparel AC6 Leather articles AC8 Paper articles AC10 Rubber articles AC13 Plastic articles AC0 Other Articles
Contributing scenario controlling environmental exposure	ERC10a, ERC11a Use in articles
Exposure scenario of the uses leading to the inclusion of the substance into the article	ES6: Consumer Use - Consumer water treatment and cleaning product use ES11: Use at industrial site - Use at industrial sites of dyestuffs and in textiles uses ES13: Use at industrial site - Use at industrial sites in construction products ES14: Use by professional worker - Professional creation of building materials and articles ES15: Consumer Use - Consumer building product use ES17: Use at industrial site - General Industrial use of coatings and inks ES19: Use by professional worker - Professional painting and coatings ES20: Consumer Use - Consumer painting and coatings ES21: Use at industrial site - General industrial use in production of polymers and resins ES22: Use by professional worker - Professional use of resins ES23: Consumer Use - Consumer resin use
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC10a Use in articles	

Amounts used, Frequency and duration of use		
Daily wide dispersive use	≤ 5.5 X 10^{-4} tonnes/day	
Percentage of tonnage used at regional scale	10%	
Conditions and measures related to municipal sewage treatment plant		
Municipal STP	Yes. [Effectiveness - Water: 87.34%]	
Discharge rate of STP	≥ 2 X 10^{3} m^3/days	
Application of the STP sludge on agricultural soil	Yes	
Conditions and measures related to external treatment of waste for disposal		
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)		
Other given operational conditions affecting environmental exposure		
Receiving surface water flow	≥ 1.8 X 10^{4} m^3/days	
Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC10a Use in articles		
Release route	**Release rate**	**Release estimation method**
Water	0.018 kg/day	ERC based
Air	2.75 X 10^{-4} kg/day	ERC based
Soil	0.018 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	3.754 X 10^{-4} mg/L	<0.01
Sea water	3.635 X 10^{-5} mg/L	<0.01
Sewage treatment plant	0.001 mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.33 X 10^{-5} mg/kg bw/day	<0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		

Exposure Scenario 29: Service life articles used by consumers

Section 1: Title of exposure scenario	
Contributing scenario controlling environmental exposure	ERC10a, ERC11a Service life articles used by consumers
Exposure scenario of the uses leading to the inclusion of the substance into the article	ES6: Consumer Use - Consumer water treatment and cleaning product use ES9: Consumer Use - Consumer cosmetics, pharmaceuticals and personal care products ES11: Use at industrial site - Use at industrial sites of dyestuffs and in textiles uses ES13: Use at industrial site - Use at industrial sites in construction products ES14: Use by professional worker - Professional creation of building materials and articles ES15: Consumer Use - Consumer building product use ES17: Use at industrial site - General Industrial use of coatings and inks ES19: Use by professional worker - Professional painting and coatings ES20: Consumer Use - Consumer painting and coatings ES21: Use at industrial site - General industrial use in production of polymers and resins ES22: Use by professional worker - Professional use of resins ES23: Consumer Use - Consumer resin use
Section 2: Operational conditions of use	
Contributing scenario controlling environmental exposure (1) ERC10a Service life articles used by consumers	
Amounts used, Frequency and duration of use	
Daily wide dispersive use	≤ 5.5 X 10^{-4} tonnes/day
Percentage of tonnage used at regional scale	10%
Conditions and measures related to municipal sewage treatment plant	
Municipal STP	Yes. [Effectiveness - Water: 87.34%]
Discharge rate of STP	≥ 2 X 10^{3} m^3/days
Application of the STP sludge on agricultural soil	Yes
Conditions and measures related to external treatment of waste for disposal	
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)	
Other given operational conditions affecting environmental exposure	
Receiving surface water flow	≥ 1.8 X 10^{4} m^3/days

Section 3: Exposure estimation and reference to its source		
Contributing scenario controlling environmental exposure (1) ERC10a Use in articles		
Release route	**Release rate**	**Release estimation method**
Water	0.018 kg/day	ERC based
Air	2.75 X 10^{-4} kg/day	ERC based
Soil	0.018 kg/day	ERC based
Protection target	**Exposure estimation**	**Risk characterisation ratio**
Fresh water	3.754 X 10^{-4} mg/L	<0.01
Sea water	3.635 X 10^{-5} mg/L	<0.01
Sewage treatment plant	0.001 mg/L	<0.01
Man via Environment - Inhalation	2.912 X 10^{-11} mg/m³	<0.01
Man via Environment - Oral	7.33 X 10^{-5} mg/kg bw/day	<0.01
Section 4: Guidance to DU to evaluate whether he works inside the boundaries set by the ES		
No additional risk management measures, besides those that are mentioned above, are needed to guarantee safe use for workers.		