

Extended Safety Data Sheet **According to Regulation (EC) No 1907/2006**

Butanone oxime

Issue date: 29/07/2015

Version 2.0

Revision date: 29/07/2015

eSDS Record Number: CSSS-TCO-010-117769

Section 1 Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier:

Identification on the label/Trade name: Butanone oxime
Additional identification: Butanone oxime
Identification of the product: CAS#: 96-29-7 ; EC# : 202-496-6
Index Number: 616-014-00-0
REACH registration No.: 01-2119539477-28-xxxx

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

1.2.1 Identified uses:

F-1: Manufacturing liquid paints
F-2: Formulation of liquid paints containing MEKO
IW-1: Industrial application of coatings
IW-2: Intermediate use of MEKO
IW-3: Formulation of liquid paints containing MEKO
IW-4: Intermediate use of MEKO
PW-1: Professional application of coatings (Indoor)
PW-2: Professional application of coatings (Outdoor)
PW-3: Professional application of paints containing MEKO
C-1: Consumer application of coatings (Indoor)
C-2: Consumer application of coatings (Outdoor)

1.2.2 Uses advised against:

Not available.

1.3 Details of the supplier of the safety data sheet:

Supplier(Only representative): Chemical Inspection & Regulation Service Limited
Supplier(Manufacturer): Hubei Xianlin Chemical Co., Ltd.
Address: Dujiatai, Xiantao City Hubei Province China
Contact person(E-mail): sales@hbxlchem.com
Telephone: +86-728-3258321
Fax: +86-728-3258270

1.4 Emergency telephone Number:

+353 41 980 6916

Available outside office hours?

YES

NO

Section 2 Hazards Identification

2.1 Classification of the substance/mixture

2.1.1 Classification:

The substance is classified as following according to REGULATION (EC) No 1272/2008:

REGULATION (EC) No 1272/2008	
Hazard classes/Hazard categories	Hazard statement
Acute Tox. 4	H312
Eye Damage 1	H318
Skin Sens. 1	H317
Carc. 2	H351

For full text of H- phrases: see section 2.2.

2.2 label elements

Hazard Pictograms:



Signal Word(S):

Danger

Hazard Statement:

H312: Harmful in contact with skin.

H317: May cause an allergic skin reaction.

H318: Causes serious eye damage.

H351: Suspected of causing cancer < inhalation exposure>.

Precautionary statement

P261: Avoid breathing dust/fume/gas/mist/vapours/spray.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P312: Call a POISON CENTER or doctor/physician if you feel unwell.

P302+P352: IF ON SKIN: Wash with plenty of soap and water.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313: IF exposed or concerned: Get medical advice/attention.

2.3 Other hazards

The substance is not considered a PBT/vPvB.

Section 3 Composition/information on ingredients

Substance/Mixture:

Substance

Ingredient(s):

Chemical Name	Registration No.	CAS No.	EC No.	Concentration
Butanone oxime	01-2119539477-28-xxxx	96-29-7	202-496-6	99.89 % (w/w)

Section 4 First aid measures

4.1 Description of first aid measures:

In all cases of doubt, or when symptoms persist, seek medical attention.

4.1.1 In case of inhalation:

Remove to fresh air.

4.1.2 In case of skin contact:

After contact with skin, wash immediately with plenty of water.

4.1.3 In case of eyes contact:

In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

4.1.4 In case of ingestion:

When swallowed, allow water to be drunk.

4.2 Most important symptoms and effects, both acute and delayed

Harmful in contact with skin. May cause an allergic skin reaction. Causes serious eye damage.

Suspected of causing cancer < inhalation exposure>.

4.3 Indication of any immediate medical attention and special treatment needed

If skin irritation or rash occurs, get medical advice/attention.

Section 5 Fire-Fighting measures

5.1 Extinguishing media:

Suitable extinguishing media: Foam, Carbon dioxide (CO₂), Dry powder

Unsuitable extinguishing media: Not available

5.2 Special hazards arising from the substance or mixture

Emits toxic fumes under fire conditions. Combustible liquid.

5.3 Special fire fighting methods and special protective actions for fire-fighters:

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Section 6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

6.1.1 For non-emergency personnel: Ensure adequate ventilation. Remove all sources of ignition. Use personal protective equipment.

6.1.2 For emergency responders: Use proper personal protective equipment as indicated in Section 8.

6.2 Environmental Precautions:

Do not allow material to be released to the environment without proper governmental permits

6.3 Methods for Containment and Cleaning up:

Soak up with inert absorbent material. Pick for disposal in tightly closed containers

6.4 Reference to other sections:

See Section 7 for information on safe handling.

See section 8 for information on personal protection equipment.

See Section 13 for information on disposal.

6.5 Additional information:

Not available

Section 7 Handling and storage

7.1 Precautions for safe handling:

7.1.1 Protective measures: Advice on safe handling: Exhaust ventilation at the object is necessary.

Advice on protection against fire and explosion: No special precautions required.

7.1.2 Advice on general occupational hygiene:

Do not eat, drink and smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage, including any incompatibilities:

Further information on storage conditions: Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from warmth. Containers should be protected against falling down.

7.3 Specific end use(s):

Not applicable.

Section 8 Exposure Controls/Personal Protection

8.1 Control parameters:

8.1.1 Occupational exposure limits: Not available

8.1.2 Additional exposure limits under the conditions of use: Not available

8.1.3 DNEL/DMEL and PNEC-Values:

DN(M)ELs for workers

Route	Type of effect	Hazard conclusion	Most sensitive endpoint
Inhalation	Systemic effects - Long-term	DNEL (Derived No Effect Level): 9 mg/m ³	repeated dose toxicity (By inhalation)
Inhalation	Systemic effects - Acute		
Inhalation	Local effects - Long-term	DNEL (Derived No Effect Level): 3.33 mg/m ³	repeated dose toxicity
Inhalation	Local effects - Acute		
Dermal	Systemic effects - Long-term	DNEL (Derived No Effect Level): 1.3 mg/kg bw/day	repeated dose toxicity (By inhalation)
Dermal	Systemic effects - Acute		acute toxicity (Dermal)
Dermal	Local effects - Long-term		
Dermal	Local effects - Acute		
Eyes	Local effects		

DN(M)ELs for the general population

Route	Type of effect	Hazard conclusion	Most sensitive endpoint
Inhalation	Systemic effects - Long-term	DNEL (Derived No Effect Level): 2.7 mg/m ³	repeated dose toxicity (By inhalation)
Inhalation	Systemic effects - Acute		
Inhalation	Local effects - Long-term	DNEL (Derived No Effect Level): 2 mg/m ³	repeated dose toxicity
Inhalation	Local effects - Acute		
Dermal	Systemic effects - Long-term	DNEL (Derived No Effect Level): 0.78 mg/kg bw/day	repeated dose toxicity
Dermal	Systemic effects - Acute	DNEL (Derived No Effect Level): 1.5 mg/kg bw/day	acute toxicity (Dermal)
Dermal	Local effects - Long-term		
Dermal	Local effects - Acute		
Oral	Systemic effects - Long-term		
Oral	Systemic effects - Acute		
Eyes	Local effects		

PNEC

PNEC	Value	Assessment factor	Remarks/Justification
PNEC _{aqua - freshwater} (mg/L)	0.256	10	Extrapolation method: assessment factor
PNEC _{aqua - marine water} (mg /L)	N/A	N/A	

PNEC _{aqua - intermittent releases} (mg /L)	0.118	100	Extrapolation method: assessment factor
PNEC _{fresh water sediment (mg/kg sediment dw)}	N/A	N/A	
PNEC _{marine-sediment(mg/kg sediment dw)}	N/A	N/A	
PNEC _{soil(mg/kg soil dw)}	N/A	N/A	
PNEC _{stp(mg/L)}	177	1	Extrapolation method: assessment factor
PNEC _{oral(mg/kg food)}	N/A	N/A	

8.2 Exposure controls

8.2.1 Appropriate engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

8.2.2 Individual protection measures, such as personal protective equipment:

Eye/face protection: Goggles

Hand protection: Glove material: Nitrile rubber. Break through time: > 480 min. Glove thickness: 0,4 mm. Camatril 730

Remarks: Supplementary note: The specifications are based on information and tests from similar substances by analogy. Due to varying conditions (e.g.temperature or other strains) it must be considered that the usage of a chemical protective glove in practice may be much shorter than the permeation time determined in accordance with EN 374. Since actual conditions of practical use often deviate from standardised conditions according EN 374 the glove manufacturer recommends to use the chemical protective glove in practice not longer than 50% of the recommended permeation time. Manufacturer's directions for use should be observed because of great diversity of types . Suitable gloves tested according EN 374 are suppliede.g. from KCL GmbH, D-36124 Eichenzell, Vertrieb@kcl.de

Body protection: Protective suit

Protective measures: The Personal Protective Equipment must be in accordance with EN standards: respirator EN 136, 140, 149; safety glasses EN 166; protective suit: EN 340, 463, 468, 943-1, 943-2; gloves EN 374, safety shoes EN-ISO 20345. Do not breathe vapours/dust. Take off all contaminated clothing immediately. Avoid contact with skin and eyes.

Respiratory protection: In the case of dust or aerosol formation use respirator with an approved filter. P3

Thermal hazards: Wear suitable protective clothing to prevent heat.

8.2.3 Environmental exposure controls: Avoid discharge into the environment.
This material and its container must be disposed of as hazardous waste.
According to local regulations, Federal and official regulations.

Section 9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance liquid at 20°C and 101.3 kPa

Melting point/range (°C): -29.5 °C at 101.3 kPa

Boiling point/range (°C): 152 °C at 101.3 kPa

Flash point (°C): 61.97 °C at 1013 hPa

Self-ignition temperature:	315 °C at 1013 hPa
Vapour pressure (25°C):	1.07 kPa at 20 °C
Relative Density:	0.92 at 20°C
Water solubility (g/l):	100000 mg/L at 25 °C
n-Octanol/Water (log Po/w):	Log Kow (Pow): 0.63 at 20 °C
Viscosity:	15mPa.s at 20 °C.
Surface tension:	30.29 mN/m at 16 °C
Dissociation constant in water(pKa):	The pKa of MEKO has been reported to be 12.45 at 24°C.

9.2. Other information:

Flammability:	non flammable
Explosive properties :	non explosive
Oxidising properties :	No Oxidising properties
Granulometry :	Not available
Stability in organic solvents and identity of relevant degradation products :	Not available

Section 10 Stability and reactivity

10.1 Reactivity:	The substance is stable under normal storage and handling conditions.
10.2 Chemical stability:	Stable.
10.3 Possibility of hazardous reactions:	No dangerous reactions known.
10.4 Conditions to avoid:	Reactions with strong acids and alkalis , Oxidizing agents
10.5 Incompatible materials:	Strong oxidizing agents, strong acids, strong bases, peroxides.
10.6 Hazardous decomposition products:	nitrogen oxides (NOx), Carbon oxides

Section 11 Toxicological information

11.1 Toxicokinetics, metabolism and distribution

Not available

11.2 Information on toxicological effects

Acute toxicity:	
LD50(Oral, Rat):	ca. 2326 mg/kg bw (male) based on: test mat.
LD50(Dermal, Rabbit):	> 1000 mg/kg bw (male/female)
LC50(Inhalation, Rat):	> 4.83 mg/L air (analytical) (male/female)
Skin corrosion/Irritation:	Not classified
Serious eye damage/irritation:	Causes serious eye damage.
Respiratory or skin sensitization:	May cause an allergic skin reaction.
Germ cell mutagenicity:	Not classified
Carcinogenicity:	Suspected of causing cancer< inhalation exposure>
Reproductive toxicity:	Not classified
STOT- single exposure:	Not classified
STOT-repeated exposure:	Not classified
Aspiration hazard:	Not classified

Section 12 Ecological information

Toxicity:

Acute toxicity		Time	Species	Method	Remarks
LC50	> 100 mg/L	96h	Fish	OECD 203	1 (reliable without restriction)
EC50	ca. 201 mg/L	48h	Daphnia	OECD 202	1 (reliable without restriction)
EC50	11.8 mg/L based on: growth rate ca. 6.09mg/L based on: biomass	72h	Algae	OECD 201	1 (reliable without restriction)

Persistence and degradability:	Biodegradation in water: inherently biodegradable
Bioaccumulative potential:	Not available
Mobility in soil:	Not available
Results of PBT&vPvB assessment:	The substance is not a PBT / vPvB substance.
Other adverse effects:	Not available

Section 13 Disposal considerations

13.1 Waste treatment methods	Dispose of the waste according to applicable local, state and federal regulations. Do not dispose of with household waste.
13.2 Product / Packaging disposal:	Product: Dispose according to legal requirements. Packaging: Legal requirements are to be considered in regard of reuse or disposal of used packaging materials.

Section 14 Transport information

	Land transport(ADR/RID)	Sea transport (IMDG)	Air transport (ICAO/IATA)
UN-Number:	Not regulated	Not regulated	Not regulated
UN Proper shipping name:	Not regulated	Not regulated	Not regulated
Transport hazard Class:	Not regulated	Not regulated	Not regulated
Packaging group:	Not regulated	Not regulated	Not regulated
Environmental hazards:	No	No	No
Special precautions for user:	See section 2.2	See section 2.2	See section 2.2
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not regulated	Not regulated	Not regulated

Section 15 Regulation information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

Relevant information regarding authorization:	Not applicable.
Relevant information regarding restriction:	Not applicable.
Other EU regulations:	Employment restrictions concerning young person must be observed. For use only by technically qualified individuals.
Other National regulations:	Not applicable
Chemical Safety Assessment has been carried out?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

Section 16 Other information

16.1 Indication of changes

Version 1.1 Amended by EU No 453/2010

Version 2.0 Placed exposure scenarios in the Annex (eSDS)

16.2 Training instructions:

Not applicable.

16.3 Further information:

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.

16.4 Notice to reader:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgment of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

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1. ES 1: Formulation; Formulation of liquid paints containing MEKO

1.1. Title section

Environment	
CS 1: Formulation of liquid paints containing MEKO	ERC 2
Worker	
CS 2: Worker contributing scenario	PROC 1
CS 3: Worker contributing scenario	PROC 2
CS 4: Worker contributing scenario	PROC 3
CS 5: Worker contributing scenario	PROC 5
CS 6: Worker contributing scenario	PROC 8a
CS 7: Worker contributing scenario	PROC 8b
CS 8: Worker contributing scenario	PROC 9

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Formulation of liquid paints containing MEKO (ERC 2)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: ≤ 0.67 tonnes/day
• Annual use at a site: ≤ 200 tonnes/year
• Percentage of tonnage used at regional scale: = 100 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 1.275%]
• Discharge rate of STP: $\geq 2E3$ m ³ /d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /d

1.2.2. Control of worker exposure: Worker contributing scenario (PROC 1)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .

Use in closed process, no likelihood of exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

1.2.3. Control of worker exposure: Worker contributing scenario (PROC 2)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed, continuous process with occasional controlled exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

1.2.4. Control of worker exposure: Worker contributing scenario (PROC 3)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed batch process (synthesis or formulation)
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use

Assumes elevated process temperature up to

1.2.5. Control of worker exposure: Worker contributing scenario (PROC 5)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

1.2.6. Control of worker exposure: Worker contributing scenario (PROC 8a)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

1.2.7. Control of worker exposure: Worker contributing scenario (PROC 8b)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

1.2.8. Control of worker exposure: Worker contributing scenario (PROC 9)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Formulation of liquid paints containing MEKO (ERC 2)

Release route	Release rate	Release estimation method
Water	3.35 kg/day	Release factor
Air	16.75 kg/day	ERC based
Soil	0.067 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	0.166 mg/L	0.649
Sewage treatment plant	1.654 mg/L	< 0.01
Man via Environment - Inhalation	0.004 mg/m ³	< 0.01

1.3.2. Worker exposure: Worker contributing scenario (PROC 1)

Product name: Butanone oxime
 Version #: 2.0 Revision date: 29-07-2015. Issue date: 29-07-2015.

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.007 mg/m ³ (TRA Worker v3)	< 0.01
Inhalation, local, long-term	0.007 mg/m ³ (TRA Worker v3)	< 0.01
Dermal, systemic, long-term	0.001 mg/kg bw/day (TRA Worker v3)	< 0.01
Combined routes, systemic, long-term		< 0.01

1.3.3. Worker exposure: Worker contributing scenario (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.363 mg/m ³ (TRA Worker v3)	0.04
Inhalation, local, long-term	0.363 mg/m ³ (TRA Worker v3)	0.109
Dermal, systemic, long-term	0.055 mg/kg bw/day (TRA Worker v3)	0.042
Combined routes, systemic, long-term		0.082

1.3.4. Worker exposure: Worker contributing scenario (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.028 mg/kg bw/day (TRA Worker v3)	0.021
Combined routes, systemic, long-term		0.102

1.3.5. Worker exposure: Worker contributing scenario (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.165

1.3.6. Worker exposure: Worker contributing scenario (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.165

1.3.7. Worker exposure: Worker contributing scenario (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.363 mg/m ³ (TRA Worker v3)	0.04

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, local, long-term	0.363 mg/m ³ (TRA Worker v3)	0.109
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.125

1.3.8. Worker exposure: Worker contributing scenario (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.055 mg/kg bw/day (TRA Worker v3)	0.042
Combined routes, systemic, long-term		0.123

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation exposure to a level below the DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary.

2. ES 2: Use at industrial site; Use at industrial site; SU 10

2.1. Title section

Formulation [mixing] of preparations and/or re-packaging (excluding alloys) (SU 10)	
Environment	
CS 1: Use at industrial site	ERC 4
Worker	
CS 2: Worker contributing scenario	PROC 1
CS 3: Worker contributing scenario	PROC 2
CS 4: Worker contributing scenario	PROC 3
CS 5: Worker contributing scenario	PROC 4
CS 6: Worker contributing scenario	PROC 5
CS 7: Worker contributing scenario	PROC 7
CS 8: Worker contributing scenario	PROC 8a
CS 9: Worker contributing scenario	PROC 8b
CS 10: Worker contributing scenario	PROC 10
CS 11: Worker contributing scenario	PROC 13

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Use at industrial site (ERC 4)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: ≤ 0.33 tonnes/day
• Annual use at a site: ≤ 100 tonnes/year
• Percentage of tonnage used at regional scale: = 100 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 1.275%]
• Discharge rate of STP: $\geq 2E3$ m ³ /d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /d

2.2.2. Control of worker exposure: Worker contributing scenario (PROC 1)

Product (article) characteristics
Limit the substance content in the product to 5 %.

Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed process, no likelihood of exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.3. Control of worker exposure: Worker contributing scenario (PROC 2)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed, continuous process with occasional controlled exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.4. Control of worker exposure: Worker contributing scenario (PROC 3)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed batch process (synthesis or formulation)
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.5. Control of worker exposure: Worker contributing scenario (PROC 4)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.6. Control of worker exposure: Worker contributing scenario (PROC 5)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.7. Control of worker exposure: Worker contributing scenario (PROC 7)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.8. Control of worker exposure: Worker contributing scenario (PROC 8a)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.9. Control of worker exposure: Worker contributing scenario (PROC 8b)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.10. Control of worker exposure: Worker contributing scenario (PROC 10)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.2.11. Control of worker exposure: Worker contributing scenario (PROC 13)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Use at industrial site (ERC 4)

Release route	Release rate	Release estimation method
Water	3.3 kg/day	Release factor
Air	0 kg/day	Release factor
Soil	16.5 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	0.164 mg/L	0.64
Sewage treatment plant	1.629 mg/L	< 0.01
Man via Environment - Inhalation	1.754E-5 mg/m ³	< 0.01

2.3.2. Worker exposure: Worker contributing scenario (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.007 mg/m ³ (TRA Worker v3)	< 0.01
Inhalation, local, long-term	0.007 mg/m ³ (TRA Worker v3)	< 0.01
Dermal, systemic, long-term	0.001 mg/kg bw/day (TRA Worker v3)	< 0.01
Combined routes, systemic, long-term		< 0.01

2.3.3. Worker exposure: Worker contributing scenario (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.363 mg/m ³ (TRA Worker v3)	0.04
Inhalation, local, long-term	0.363 mg/m ³ (TRA Worker v3)	0.109
Dermal, systemic, long-term	0.055 mg/kg bw/day (TRA Worker v3)	0.042
Combined routes, systemic, long-term		0.082

2.3.4. Worker exposure: Worker contributing scenario (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.028 mg/kg bw/day (TRA Worker v3)	0.021
Combined routes, systemic, long-term		0.102

2.3.5. Worker exposure: Worker contributing scenario (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.016 mg/m ³ (TRA Worker v3)	0.113
Inhalation, local, long-term	1.016 mg/m ³ (TRA Worker v3)	0.305
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.211

Route of exposure and type of effects	Exposure estimate	RCR
Combined routes, systemic, long-term		0.324

2.3.6. Worker exposure: Worker contributing scenario (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.165

2.3.7. Worker exposure: Worker contributing scenario (PROC 7)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.271 mg/m ³ (TRA Worker v3)	0.141
Inhalation, local, long-term	1.271 mg/m ³ (TRA Worker v3)	0.382
Dermal, systemic, long-term	0.343 mg/kg bw/day (TRA Worker v3)	0.264
Combined routes, systemic, long-term		0.405

2.3.8. Worker exposure: Worker contributing scenario (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.165

2.3.9. Worker exposure: Worker contributing scenario (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.363 mg/m ³ (TRA Worker v3)	0.04
Inhalation, local, long-term	0.363 mg/m ³ (TRA Worker v3)	0.109
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.125

2.3.10. Worker exposure: Worker contributing scenario (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.726 mg/m ³ (TRA Worker v3)	0.081
Inhalation, local, long-term	0.726 mg/m ³ (TRA Worker v3)	0.218
Dermal, systemic, long-term	0.219 mg/kg bw/day (TRA Worker v3)	0.169
Combined routes, systemic, long-term		0.25

2.3.11. Worker exposure: Worker contributing scenario (PROC 13)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.548 mg/kg bw/day (TRA Worker v3)	0.422
Combined routes, systemic, long-term		0.704

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation exposure to a level below the DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary.

3. ES 3: Use at industrial site; Use at industrial site; SU 9

3.1. Title section

Manufacture of fine chemicals (SU 9)	
Environment	
CS 1: Use at industrial site	ERC 6b
Worker	
CS 2: Worker contributing scenario	PROC 1
CS 3: Worker contributing scenario	PROC 2
CS 4: Worker contributing scenario	PROC 3
CS 5: Worker contributing scenario	PROC 5
CS 6: Worker contributing scenario	PROC 8a
CS 7: Worker contributing scenario	PROC 8b
CS 8: Worker contributing scenario	PROC 9

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Use at industrial site (ERC 6b)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.67 tonnes/day
• Annual use at a site: <= 200 tonnes/year
• Percentage of tonnage used at regional scale: = 100 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 1.275%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

3.2.2. Control of worker exposure: Worker contributing scenario (PROC 1)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed process, no likelihood of exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

3.2.3. Control of worker exposure: Worker contributing scenario (PROC 2)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed, continuous process with occasional controlled exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

3.2.4. Control of worker exposure: Worker contributing scenario (PROC 3)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in closed batch process (synthesis or formulation)
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes elevated process temperature up to

3.2.5. Control of worker exposure: Worker contributing scenario (PROC 5)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

3.2.6. Control of worker exposure: Worker contributing scenario (PROC 8a)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

3.2.7. Control of worker exposure: Worker contributing scenario (PROC 8b)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.

Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

3.2.8. Control of worker exposure: Worker contributing scenario (PROC 9)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Use at industrial site (ERC 6b)

Release route	Release rate	Release estimation method
Water	0.067 kg/day	Release factor
Air	0.67 kg/day	ERC based
Soil	0.168 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	0.004 mg/L	0.016
Sewage treatment plant	0.033 mg/L	< 0.01
Man via Environment - Inhalation	1.605E-4 mg/m ³	< 0.01

3.3.2. Worker exposure: Worker contributing scenario (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.036 mg/m ³ (TRA Worker v3)	< 0.01
Inhalation, local, long-term	0.036 mg/m ³ (TRA Worker v3)	0.011
Dermal, systemic, long-term	0.007 mg/kg bw/day (TRA Worker v3)	< 0.01
Combined routes, systemic, long-term		< 0.01

3.3.3. Worker exposure: Worker contributing scenario (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.815 mg/m ³ (TRA Worker v3)	0.202
Inhalation, local, long-term	1.815 mg/m ³ (TRA Worker v3)	0.545
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.211
Combined routes, systemic, long-term		0.412

3.3.4. Worker exposure: Worker contributing scenario (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.138 mg/kg bw/day (TRA Worker v3)	0.106
Combined routes, systemic, long-term		0.388

3.3.5. Worker exposure: Worker contributing scenario (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.548 mg/kg bw/day (TRA Worker v3)	0.422
Combined routes, systemic, long-term		0.704

3.3.6. Worker exposure: Worker contributing scenario (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.548 mg/kg bw/day (TRA Worker v3)	0.422
Combined routes, systemic, long-term		0.704

3.3.7. Worker exposure: Worker contributing scenario (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
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Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.271 mg/m ³ (TRA Worker v3)	0.141
Inhalation, local, long-term	1.271 mg/m ³ (TRA Worker v3)	0.382
Dermal, systemic, long-term	0.548 mg/kg bw/day (TRA Worker v3)	0.422
Combined routes, systemic, long-term		0.563

3.3.8. Worker exposure: Worker contributing scenario (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.211
Combined routes, systemic, long-term		0.493

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation exposure to a level below the DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary.

4. ES 4: Use at industrial site; Use at industrial site; SU 9

4.1. Title section

Manufacture of fine chemicals (SU 9)	
Environment	
CS 1: Use at industrial site	ERC 6a
Worker	
CS 2: Worker contributing scenario	PROC 1
CS 3: Worker contributing scenario	PROC 2
CS 4: Worker contributing scenario	PROC 3
CS 5: Worker contributing scenario	PROC 5
CS 6: Worker contributing scenario	PROC 8a
CS 7: Worker contributing scenario	PROC 8b
CS 8: Worker contributing scenario	PROC 9

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Use at industrial site (ERC 6a)

Amount used, frequency and duration of use (or from service life)
• Daily use at site: <= 0.67 tonnes/day
• Annual use at a site: <= 200 tonnes/year
• Percentage of tonnage used at regional scale: = 100 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 1.275%]
• Discharge rate of STP: >= 2E3 m3/d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/d

4.2.2. Control of worker exposure: Worker contributing scenario (PROC 1)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures

Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed process, no likelihood of exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

4.2.3. Control of worker exposure: Worker contributing scenario (PROC 2)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed, continuous process with occasional controlled exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

4.2.4. Control of worker exposure: Worker contributing scenario (PROC 3)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in closed batch process (synthesis or formulation)
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes elevated process temperature up to

4.2.5. Control of worker exposure: Worker contributing scenario (PROC 5)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

4.2.6. Control of worker exposure: Worker contributing scenario (PROC 8a)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

4.2.7. Control of worker exposure: Worker contributing scenario (PROC 8b)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.

Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

4.2.8. Control of worker exposure: Worker contributing scenario (PROC 9)

Product (article) characteristics
<i>Covers percentage substance in the product up to 100 %.</i>
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Use at industrial site (ERC 6a)

Release route	Release rate	Release estimation method
Water	0.067 kg/day	Release factor
Air	33.5 kg/day	ERC based
Soil	0.67 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	0.004 mg/L	0.016
Sewage treatment plant	0.033 mg/L	< 0.01
Man via Environment - Inhalation	0.008 mg/m ³	< 0.01

4.3.2. Worker exposure: Worker contributing scenario (PROC 1)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	0.036 mg/m ³ (TRA Worker v3)	< 0.01
Inhalation, local, long-term	0.036 mg/m ³ (TRA Worker v3)	0.011
Dermal, systemic, long-term	0.007 mg/kg bw/day (TRA Worker v3)	< 0.01
Combined routes, systemic, long-term		< 0.01

4.3.3. Worker exposure: Worker contributing scenario (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.815 mg/m ³ (TRA Worker v3)	0.202
Inhalation, local, long-term	1.815 mg/m ³ (TRA Worker v3)	0.545
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.211
Combined routes, systemic, long-term		0.412

4.3.4. Worker exposure: Worker contributing scenario (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.138 mg/kg bw/day (TRA Worker v3)	0.106
Combined routes, systemic, long-term		0.388

4.3.5. Worker exposure: Worker contributing scenario (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.548 mg/kg bw/day (TRA Worker v3)	0.422
Combined routes, systemic, long-term		0.704

4.3.6. Worker exposure: Worker contributing scenario (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.548 mg/kg bw/day (TRA Worker v3)	0.422
Combined routes, systemic, long-term		0.704

4.3.7. Worker exposure: Worker contributing scenario (PROC 8b)

Route of exposure and type of effects	Exposure estimate	RCR
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Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.271 mg/m ³ (TRA Worker v3)	0.141
Inhalation, local, long-term	1.271 mg/m ³ (TRA Worker v3)	0.382
Dermal, systemic, long-term	0.548 mg/kg bw/day (TRA Worker v3)	0.422
Combined routes, systemic, long-term		0.563

4.3.8. Worker exposure: Worker contributing scenario (PROC 9)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.211
Combined routes, systemic, long-term		0.493

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation exposure to a level below the DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary.

5. ES 5: Use by professional worker; Use by professional worker

5.1. Title section

Environment	
CS 1: Use by professional worker	ERC 8d, ERC 8a
Worker	
CS 2: Worker contributing scenario	PROC 2
CS 3: Worker contributing scenario	PROC 3
CS 4: Worker contributing scenario	PROC 4
CS 5: Worker contributing scenario	PROC 5
CS 6: Worker contributing scenario	PROC 8a
CS 7: Worker contributing scenario	PROC 10
CS 8: Worker contributing scenario	PROC 11
CS 9: Worker contributing scenario	PROC 19

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Use by professional worker (ERC 8d)

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: $\leq 1.65E-4$ tonnes/day
• Percentage of tonnage used at regional scale: = 10 %
Conditions and measures related to sewage treatment plant
• Municipal STP: Yes [Effectiveness Water: 1.275%]
• Discharge rate of STP: $\geq 2E3$ m ³ /d
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /d

5.2.2. Control of worker exposure: Worker contributing scenario (PROC 2)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .

Use in closed, continuous process with occasional controlled exposure
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

5.2.3. Control of worker exposure: Worker contributing scenario (PROC 3)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
Use in closed batch process (synthesis or formulation)
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

5.2.4. Control of worker exposure: Worker contributing scenario (PROC 4)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) .
Use in semi-closed process with opportunity for exposure
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes elevated process temperature up to

5.2.5. Control of worker exposure: Worker contributing scenario (PROC 5)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

5.2.6. Control of worker exposure: Worker contributing scenario (PROC 8a)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

5.2.7. Control of worker exposure: Worker contributing scenario (PROC 10)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.

Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

5.2.8. Control of worker exposure: Worker contributing scenario (PROC 11)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 15 minutes.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Indoor use
Assumes elevated process temperature up to

5.2.9. Control of worker exposure: Worker contributing scenario (PROC 19)

Product (article) characteristics
Limit the substance content in the product to 5 %.
Amount used (or contained in articles), frequency and duration of use/exposure
Avoid carrying out activities involving exposure for more than 1 hour.
Technical and organisational conditions and measures
Provide a basic standard of general ventilation (1 to 3 air changes per hour) .
<i>Basic (professional) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with basic employee training.; For further specification, refer to section 8 of the SDS.
Wear a respirator providing a minimum efficiency of; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure

Indoor use
Assumes elevated process temperature up to

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Use by professional worker (ERC 8d)

Release route	Release rate	Release estimation method
Water	0.165 kg/day	ERC based
Air	0.165 kg/day	ERC based
Soil	0.033 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	0.009 mg/L	0.035
Sewage treatment plant	0.081 mg/L	< 0.01
Man via Environment - Inhalation	8.726E-6 mg/m ³	< 0.01

5.3.2. Worker exposure: Worker contributing scenario (PROC 2)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.452 mg/m ³ (TRA Worker v3)	0.161
Inhalation, local, long-term	1.452 mg/m ³ (TRA Worker v3)	0.436
Dermal, systemic, long-term	0.055 mg/kg bw/day (TRA Worker v3)	0.042
Combined routes, systemic, long-term		0.204

5.3.3. Worker exposure: Worker contributing scenario (PROC 3)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.815 mg/m ³ (TRA Worker v3)	0.202
Inhalation, local, long-term	1.815 mg/m ³ (TRA Worker v3)	0.545
Dermal, systemic, long-term	0.028 mg/kg bw/day (TRA Worker v3)	0.021
Combined routes, systemic, long-term		0.223

5.3.4. Worker exposure: Worker contributing scenario (PROC 4)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	2.541 mg/m ³ (TRA Worker v3)	0.282
Inhalation, local, long-term	2.541 mg/m ³ (TRA Worker v3)	0.763
Dermal, systemic, long-term	0.274 mg/kg bw/day (TRA Worker v3)	0.211
Combined routes, systemic, long-term		0.493

5.3.5. Worker exposure: Worker contributing scenario (PROC 5)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.452 mg/m ³ (TRA Worker v3)	0.161
Inhalation, local, long-term	1.452 mg/m ³ (TRA Worker v3)	0.436
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.246

5.3.6. Worker exposure: Worker contributing scenario (PROC 8a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.452 mg/m ³ (TRA Worker v3)	0.161
Inhalation, local, long-term	1.452 mg/m ³ (TRA Worker v3)	0.436
Dermal, systemic, long-term	0.11 mg/kg bw/day (TRA Worker v3)	0.084
Combined routes, systemic, long-term		0.246

5.3.7. Worker exposure: Worker contributing scenario (PROC 10)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.452 mg/m ³ (TRA Worker v3)	0.161
Inhalation, local, long-term	1.452 mg/m ³ (TRA Worker v3)	0.436
Dermal, systemic, long-term	0.219 mg/kg bw/day (TRA Worker v3)	0.169
Combined routes, systemic, long-term		0.33

5.3.8. Worker exposure: Worker contributing scenario (PROC 11)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.815 mg/m ³ (TRA Worker v3)	0.202
Inhalation, local, long-term	1.815 mg/m ³ (TRA Worker v3)	0.545
Dermal, systemic, long-term	0.429 mg/kg bw/day (TRA Worker v3)	0.33
Combined routes, systemic, long-term		0.531

5.3.9. Worker exposure: Worker contributing scenario (PROC 19)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.452 mg/m ³ (TRA Worker v3)	0.161
Inhalation, local, long-term	1.452 mg/m ³ (TRA Worker v3)	0.436
Dermal, systemic, long-term	0.566 mg/kg bw/day (TRA Worker v3)	0.435
Combined routes, systemic, long-term		0.596

5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation exposure to a level below the DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an

appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary.

6. ES 6: Consumer Use; Consumer Use

6.1. Title section

Environment	
CS 1: Consumer Use	ERC 8d, ERC 8a
Consumer	
CS 2: Consumer contributing scenario	PC 9a

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Consumer Use (ERC 8d)

Amount used, frequency and duration of use (or from service life)
• Daily wide dispersive use: $\leq 1.1E-4$ tonnes/day
• Percentage of tonnage used at regional scale: = 10 %
Conditions and measures related to treatment of waste (including article waste)
• Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
• Municipal STP: Yes [Effectiveness Water: 1.275%]
• Discharge rate of STP: $\geq 2E3$ m ³ /d
• Application of the STP sludge on agricultural soil: Yes
• Receiving surface water flow rate: $\geq 1.8E4$ m ³ /d

6.2.2. Control of consumer exposure: Consumer contributing scenario (PC 9a)

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Consumer Use (ERC 8d)

Release route	Release rate	Release estimation method
Water	0.11 kg/day	ERC based
Air	0.11 kg/day	ERC based
Soil	0.022 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	0.006 mg/L	0.024
Sewage treatment plant	0.054 mg/L	< 0.01
Man via Environment - Inhalation	8.538E-6 mg/m ³	< 0.01

6.3.2. Consumer exposure: Consumer contributing scenario (PC 9a)

Route of exposure and type of effects	Exposure estimate	RCR
Inhalation, systemic, long-term	1.8 mg/m ³ (External Tool: <i>ECETOC TRA consumers v2</i>)	0.667
Dermal, systemic, long-term	0.154 mg/kg bw/day (External Tool: <i>ECETOC TRA consumers v2</i>)	0.197
Combined routes, systemic, long-term		0.864

6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation exposure to a level below the DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below. If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure. The dustiness of the substance used can be determined according to the MEASE glossary.