

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Heraeus

Ru(III) Chloride Hyd. HSTD P

Version
6.0

Revision Date:
10.08.2020

Date of last issue: 26.02.2020
Date of first issue: 26.11.2015

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

1.1 Product identifier

Trade name : Ru(III) Chloride Hyd. HSTD P
Product code : 81147407
REACH Registration Number : 01-2120746666-43-0000
Company : Heraeus Deutschland GmbH & Co. KG

Heraeus companies not listed here do not have a REACH registration, because the companies either are located outside the EU or they are not required to register due to the annual amount of produced/imported substance.

Substance name : Ruthenium (III)-chloride hydrate
CAS-No. : 14898-67-0
EC-No. : 233-167-5

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

Use of the Substance/Mixture : Industrial use, Catalyst

1.3 Details of the supplier of the safety data sheet

Company : Heraeus Deutschland GmbH & Co. KG
Heraeusstr. 12-14
63450 Hanau
Telephone : +496181351
E-mail address of person responsible for the SDS : sds@heraeus.com
(Heraeus Holding: EHS Chemical Safety)

1.4 Emergency telephone number

Emergency telephone number : +49 6132-84463
International Emergency Number
This telephone number is available 24 hours per day, 7 days per week.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Corrosive to metals, Category 1 : H290: May be corrosive to metals.
Acute toxicity, Category 4 : H302: Harmful if swallowed.

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Skin corrosion, Sub-category 1B
Short-term (acute) aquatic hazard, Category 1
Long-term (chronic) aquatic hazard, Category 1

H314: Causes severe skin burns and eye damage.
H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P260 Do not breathe dust or mist.

Response:

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

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

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical nature : inorganic

Chemical name	CAS-No. EC-No. Index-No.	Concentration (% w/w)
Ruthenium (III)-chloride	14898-67-0	100

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hydrate

233-167-5

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : First aider needs to protect himself.
Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
- If inhaled : Move to fresh air.
Get medical attention.
- In case of skin contact : Take off all contaminated clothing immediately.
Get medical attention immediately.
Wash off with soap and plenty of water.
- In case of eye contact : In case of eye contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Keep eye wide open while rinsing.
Protect unharmed eye.
Call a physician immediately.
- If swallowed : Immediately give large quantities of water to drink.
Do NOT induce vomiting.
Get medical attention.

4.2 Most important symptoms and effects, both acute and delayed

- Risks : Harmful if swallowed.
Causes serious eye damage.
Causes severe burns.

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2 Special hazards arising from the substance or mixture

- Specific hazards during fire-fighting : Exposure to decomposition products may be a hazard to health.

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Hazardous combustion products : Chlorine compounds
Metal oxides

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.
Use personal protective equipment.

Further information : Use a water spray to cool fully closed containers.
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Follow safe handling advice and personal protective equipment recommendations.
Ensure adequate ventilation.
Evacuate personnel to safe areas.
Refer to protective measures listed in sections 7 and 8.

6.2 Environmental precautions

Environmental precautions : Do not allow contact with soil, surface or ground water.
Do not let product enter drains.
If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Pick up and arrange disposal without creating dust.
Sweep up or vacuum up spillage and collect in suitable container for disposal.

6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling : Provide sufficient air exchange and/or exhaust in work rooms.
Wear personal protective equipment.
Avoid inhalation, ingestion and contact with skin and eyes.
Smoking, eating and drinking should be prohibited in the application area.

Hygiene measures : Keep away from food and drink. Wash hands before breaks and at the end of workday. Keep working clothes separately.
Remove and wash contaminated clothing and gloves, including the inside, before re-use.

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7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Keep tightly closed in a dry, cool and well-ventilated place.

Storage class (TRGS 510) : 8B, Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)

Specific use(s) : No data available

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Engineering measures

Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment

Eye protection : Safety glasses with side-shields

Hand protection

Remarks : Before removing gloves clean them with soap and water. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

Skin and body protection : Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Filter type : Filter type ABEK-P

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance : powder
Colour : dark brown
Odour : slight
Odour Threshold : No data available

pH : Not applicable

: 100 °C (1.013 hPa)

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Boiling point/boiling range	:	Not applicable
Flash point	:	Not applicable
Evaporation rate	:	Not applicable
Flammability (solid, gas)	:	No data available
Upper explosion limit / Upper flammability limit	:	Not applicable
Lower explosion limit / Lower flammability limit	:	Not applicable
Vapour pressure	:	Not applicable
Relative vapour density	:	Not applicable
Relative density	:	No data available
Density	:	3,11 g/cm ³ (23 °C, 1.013 hPa)
Solubility(ies)		
Water solubility	:	No data available
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	Not applicable
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	Not applicable
Viscosity, kinematic	:	Not applicable
Explosive properties	:	No data available
Oxidizing properties	:	No data available

9.2 Other information

Molecular weight	:	224,8 g/mol
Metal corrosion rate	:	Corrosive to metals
Self-ignition	:	No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity

No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : No dangerous reaction known under conditions of normal use.

10.4 Conditions to avoid

Conditions to avoid : No data available

10.5 Incompatible materials

Materials to avoid : No data available

10.6 Hazardous decomposition products

No data available

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Harmful if swallowed.

Components:

Ruthenium (III)-chloride hydrate:

Acute oral toxicity : LD50 (Rat): 595 mg/kg

Skin corrosion/irritation

Causes severe burns.

Components:

Ruthenium (III)-chloride hydrate:

Result : Corrosive after 3 minutes to 1 hour of exposure

Serious eye damage/eye irritation

Causes serious eye damage.

Components:

Ruthenium (III)-chloride hydrate:

Result : Irreversible effects on the eye

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Respiratory or skin sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Germ cell mutagenicity

Not classified based on available information.

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Not classified based on available information.

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

Not classified based on available information.

Aspiration toxicity

Not classified based on available information.

SECTION 12: Ecological information

12.1 Toxicity

Components:

Ruthenium (III)-chloride hydrate:

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 53 mg/l
Exposure time: 48 h

12.2 Persistence and degradability

No data available

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher..

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12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

- Product : If recycling is not practicable, dispose of in compliance with local regulations.
- Contaminated packaging : Dispose of as unused product.
-

SECTION 14: Transport information

14.1 UN number

- ADN : UN 1759
- ADR : UN 1759
- RID : UN 1759
- IMDG : UN 1759
- IATA : UN 1759

14.2 UN proper shipping name

- ADN : CORROSIVE SOLID, N.O.S.
(Ruthenium (III)-chloride hydrate)
- ADR : CORROSIVE SOLID, N.O.S.
(Ruthenium (III)-chloride hydrate)
- RID : CORROSIVE SOLID, N.O.S.
(Ruthenium (III)-chloride hydrate)
- IMDG : CORROSIVE SOLID, N.O.S.
(Ruthenium (III)-chloride hydrate)
- IATA : Corrosive solid, n.o.s.
(Ruthenium (III)-chloride hydrate)

14.3 Transport hazard class(es)

- ADN : 8
- ADR : 8
- RID : 8
- IMDG : 8
- IATA : 8

14.4 Packing group

- ADN
Packing group : II
-

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Classification Code : C10
Hazard Identification Number : 80
Labels : 8

ADR

Packing group : II
Classification Code : C10
Hazard Identification Number : 80
Labels : 8
Tunnel restriction code : (E)

RID

Packing group : II
Classification Code : C10
Hazard Identification Number : 80
Labels : 8

IMDG

Packing group : II
Labels : 8
EmS Code : F-A, S-B

IATA (Cargo)

Packing instruction (cargo aircraft) : 863
Packing instruction (LQ) : Y844
Packing group : II
Labels : Corrosive

IATA (Passenger)

Packing instruction (passenger aircraft) : 859
Packing instruction (LQ) : Y844
Packing group : II
Labels : Corrosive

14.5 Environmental hazards

ADN

Environmentally hazardous : yes

ADR

Environmentally hazardous : yes

RID

Environmentally hazardous : yes

IMDG

Marine pollutant : yes

14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

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

Not applicable for product as supplied.

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SECTION 15: Regulatory information

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

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)	:	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	Not applicable
REACH - List of substances subject to authorisation (Annex XIV)	:	Not applicable
Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	:	Not applicable
Regulation (EU) 2019/1021 on persistent organic pollutants (recast)	:	Not applicable
Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals	:	Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

E1 ENVIRONMENTAL HAZARDS

Water contaminating class (Germany) : WGK 2 obviously hazardous to water
Code Number: 7.234
Classification according to AwSV, Annex 1 (4)

Other regulations:

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx -

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Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

DE / EN

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Annex: Exposure Scenarios

All data concerning masses and concentrations in this Annex are related to the metal.

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Number	Title
ES 1	Manufacture of the substance (as such)
ES 2	Use at industrial site - Manufacture of the substance in the catalyst industry
ES 3	Formulation or re-packing (industrial) - Formulation of surface treatment solutions
ES 4	Use at industrial site - Use in Electroplating or Metal Surface Treatment
ES 5	Use at industrial site - Use as an Intermediate
ES 6	Use in electroplating - Professional

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ES 1: Manufacture of the substance (as such)

1.1. Title section

Exposure Scenario name	: Manufacture of the substance (as such)
Structured Short Title	: Manufacture of the substance (as such)

Environment		
CS 1	Manufacture of the substance (as such)	ERC1
Worker		
CS 2	Manufacture of the substance (as such)	PROC1
CS 3	Manufacture of the substance (as such)	PROC3
CS 4	Manufacture of the substance (as such)	PROC4
CS 5	Manufacture of the substance (as such)	PROC8a
CS 6	Manufacture of the substance (as such)	PROC8b
CS 7	Manufacture of the substance (as such)	PROC8a
CS 8	Manufacture of the substance (as such)	PROC26
CS 9	Manufacture of the substance (as such)	PROC8b
CS 10	Manufacture of the substance (as such)	PROC9
CS 11	Manufacture of the substance (as such)	PROC9
CS 12	Manufacture of the substance (as such)	PROC15
CS 13	Manufacture of the substance (as such)	PROC15
CS 14	Manufacture of the substance (as such)	PROC23
CS 15	Manufacture of the substance (as such)	PROC26

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Manufacture of the substance (as such) - Discharge via STP (ERC1)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid

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Amount used (or contained in articles), frequency and duration of use/exposure	
Maximum allowable site tonnage (MSafe)	: 48,7 tonnes/year
Critical compartment for Msafe	: Freshwater
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: If recycling is not practicable, dispose of in compliance with local regulations.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 93.000 m3/d
Local freshwater dilution factor	: 50
Local marine water dilution factor	: 100

1.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

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1.2.3. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.4. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation	
Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	

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Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid

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Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.7. Control of worker exposure: Wet cleaning (PROC8a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

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1.2.8. Control of worker exposure: Handling of solid inorganic substances at ambient temperature (PROC26)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.9. Control of worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	

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Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.10. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.11. Control of worker exposure: Small scale handling/transfer of solutions (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	

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Duration	:	> 4 hrs
Use frequency	:	5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection.		
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %		
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use

1.2.12. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers percentage substance in the product up to 100 %.		
Physical form of product	:	solid
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration	:	> 4 hrs
Use frequency	:	5 days per week
Technical and organisational conditions and measures		
Local exhaust ventilation Inhalation - minimum efficiency of 84 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection.		
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %		
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use

1.2.13. Control of worker exposure: Laboratory analyses (PROC15)

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Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

1.2.14. Control of worker exposure: Open processing and transfer operations at substantially elevated temperature (PROC23)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	

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Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use

1.2.15. Control of worker exposure: Vacuum cleaning (PROC26)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product : solid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : > 4 hrs

Use frequency : 5 days per week

Technical and organisational conditions and measures

Local exhaust ventilation
Inhalation - minimum efficiency of 84 %

Conditions and measures related to personal protection, hygiene and health evaluation

Use suitable eye protection.
Wear suitable respiratory protection.
Inhalation - minimum efficiency of 95 %
Wear suitable gloves tested to EN374.
Dermal - minimum efficiency of 90 %

Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Manufacture of the substance (as such) - Discharge via STP (ERC1)

Release route	Release rate	Release estimation method
Water	40 g/t	measured data
Air	300 g/t	measured data

Protection Target	Exposure estimate	RCR
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Sewage treatment plant	0,000341 mg/L	< 0,01
Freshwater	0,0000464 mg/L	0,019
Freshwater sediment	0,043 mg/kg dry weight	0,056
Soil	0,000145 mg/kg dry weight	< 0,01

1.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,027

1.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,22 mg/m ³ (MEASE)	0,579
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,58

1.3.4. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

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Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,2 mg/m ³ (MEASE)	0,526
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,528

1.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,24 mg/m ³ (MEASE)	0,632
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	0,041 mg/kg bw/day (MEASE)	0,152
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,783

1.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,2 mg/m ³ (MEASE)	0,526
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1

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dermal	local	short-term		< 1
combined routes	systemic	long-term		0,528

1.3.7. Worker exposure: Wet cleaning (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	0,034 mg/kg bw/day (MEASE)	0,126
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,258

1.3.8. Worker exposure: Handling of solid inorganic substances at ambient temperature (PROC26)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,216

1.3.9. Worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1

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inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,027

1.3.10. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,32 mg/m ³ (MEASE)	0,842
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,004 mg/kg bw/day (MEASE)	0,013
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,855

1.3.11. Worker exposure: Small scale handling/transfer of solutions (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,004 mg/kg bw/day (MEASE)	0,013
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,039

1.3.12. Worker exposure: Use as laboratory reagent (PROC15)

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Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,217

1.3.13. Worker exposure: Laboratory analyses (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,033

1.3.14. Worker exposure: Open processing and transfer operations at substantially elevated temperature (PROC23)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,11 mg/m ³ (MEASE)	0,289
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1

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combined routes	systemic	long-term		0,295
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1.3.15. Worker exposure: Vacuum cleaning (PROC26)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,216

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

If the conditions of downstream use deviate from the measures or parameters described in the exposure scenario, the downstream use can still be considered to be within the conditions of the exposure scenario when the following criteria are met: The resulting risk characterisation ratios (RCR) for the deviating conditions, using the method described in the scenario or a compatible tool ("scaling tool"), have to be equal to or lower than the values given in the exposure scenario. Scalable parameters are restricted to those that a downstream user can actively change by adapting the process, and may vary depending on the method used for exposure assessment. Intrinsic substance properties like vapour pressure or diffusion rates and those parameters specific to the process, e.g. the exposed skin area, may not be scaled.

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ES 2: Use at industrial site - Manufacture of the substance in the catalyst industry

2.1. Title section

Exposure Scenario name	: Use at industrial site - Manufacture of the substance in the catalyst industry
Structured Short Title	: Use at industrial site - Manufacture of the substance in the catalyst industry

Environment		
CS 1	Use at industrial site - Manufacture of the substance in the catalyst industry	ERC1
Worker		
CS 2	Use at industrial site - Manufacture of the substance in the catalyst industry	PROC1
CS 3	Use at industrial site - Manufacture of the substance in the catalyst industry	PROC3
CS 4	Use at industrial site - Manufacture of the substance in the catalyst industry	PROC8b
CS 5	Use at industrial site - Manufacture of the substance in the catalyst industry	PROC9
CS 6	Use at industrial site - Manufacture of the substance in the catalyst industry	PROC22
CS 7	Use at industrial site - Manufacture of the substance in the catalyst industry	PROC26
CS 8	Use at industrial site - Manufacture of the substance in the catalyst industry	PROC 27b

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Manufacture of the substance (ERC1)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	

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Maximum allowable site tonnage (MSafe)	: 6,5 tonnes/year
Critical compartment for Msafe	: Freshwater
Conditions and measures related to sewage treatment plant	
STP type	: Municipal Sewage Treatment Plant
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: If recycling is not practicable, dispose of in compliance with local regulations.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 93.000 m ³ /d
Local freshwater dilution factor	: 9
Local marine water dilution factor	: 100

2.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

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2.2.3. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.2.4. Control of worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection.	

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Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.2.5. Control of worker exposure: Small scale handling/transfer of solutions (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.2.6. Control of worker exposure: Manufacturing and processing of minerals and/or metals at substantially elevated temperature (PROC22)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week

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Technical and organisational conditions and measures
Local exhaust ventilation Dermal - minimum efficiency of 78 %
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Indoor use

2.2.7. Control of worker exposure: Vacuum cleaning (PROC26)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : solid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : > 4 hrs
Use frequency : 5 days per week
Technical and organisational conditions and measures
Local exhaust ventilation Dermal - minimum efficiency of 84 %
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection.
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Indoor use

2.2.8. Control of worker exposure: Production of metal powders (wet processes) (PROC 27b)

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Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Manufacture of the substance (ERC1)

Release route	Release rate	Release estimation method
Water	67 g/t	measured data
Air	250 g/t	measured data

Protection Target	Exposure estimate	RCR
Sewage treatment plant	0,000288 mg/L	< 0,01
Freshwater	0,0000195 mg/L	0,08
Soil	0,000214 mg/kg dry weight	< 0,01

2.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³	0,026

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			(MEASE)	
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,027

2.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,22 mg/m ³ (MEASE)	0,579
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,58

2.3.4. Worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,027

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2.3.5. Worker exposure: Small scale handling/transfer of solutions (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,004 mg/kg bw/day (MEASE)	0,013
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,039

2.3.6. Worker exposure: Manufacturing and processing of minerals and/or metals at substantially elevated temperature (PROC22)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,22 mg/m ³ (MEASE)	0,579
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,584

2.3.7. Worker exposure: Vacuum cleaning (PROC26)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01

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dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,216

2.3.8. Worker exposure: Production of metal powders (wet processes) (PROC 27b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,1 mg/m ³ (MEASE)	0,263
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,216

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

If the conditions of downstream use deviate from the measures or parameters described in the exposure scenario, the downstream use can still be considered to be within the conditions of the exposure scenario when the following criteria are met: The resulting risk characterisation ratios (RCR) for the deviating conditions, using the method described in the scenario or a compatible tool ("scaling tool"), have to be equal to or lower than the values given in the exposure scenario. Scalable parameters are restricted to those that a downstream user can actively change by adapting the process, and may vary depending on the method used for exposure assessment. Intrinsic substance properties like vapour pressure or diffusion rates and those parameters specific to the process, e.g. the exposed skin area, may not be scaled.

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ES 3: Formulation or re-packing (industrial) - Formulation of surface treatment solutions

3.1. Title section

Exposure Scenario name	: Formulation or re-packing (industrial) - Formulation of surface treatment solutions
Structured Short Title	: Formulation or re-packing (industrial) - Formulation of surface treatment solutions

Environment		
CS 1	Manufacture of the substance (as such)	ERC1
Worker		
CS 2	Use at industrial site - Formulation for use as flocculent or coagulant in water and waste water treatment	PROC3
CS 3	Formulation or re-packing (industrial) - Formulation of surface treatment solutions	PROC4
CS 4	Formulation or re-packing (industrial) - Formulation of surface treatment solutions	PROC9
CS 5	Formulation or re-packing (industrial) - Formulation of surface treatment solutions	PROC26
CS 6	Formulation or re-packing (industrial) - Formulation of surface treatment solutions	PROC 27b

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Manufacture of substances (ERC1)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Maximum allowable site tonnage (MSafe)	: 48,7 tonnes/year
Critical compartment for Msafe	: Freshwater

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Conditions and measures related to sewage treatment plant	
STP type	: Onsite Sewage Treatment Plant
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: If recycling is not practicable, dispose of in compliance with local regulations.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 93,000 m ³ /d
Local freshwater dilution factor	: 50

3.2.2. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: < 4 hrs
Use frequency	: 5 days/week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Inhalation - minimum efficiency of 90 %	

3.2.3. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics

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Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.2.4. Control of worker exposure: Small scale handling/transfer of solutions (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: < 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.2.5. Control of worker exposure: Vacuum cleaning (PROC26)

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Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: < 4 hrs
Use frequency	: 5 days/week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

3.2.6. Control of worker exposure: Production of metal powders (wet processes) (PROC 27b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	

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Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Manufacture of substances (ERC1)

Release route	Release rate	Release estimation method
Water	40 g/t	measured data
Air	300 g/t	measured data

Protection Target	Exposure estimate	RCR
Sewage treatment plant	< 0,0004 mg/L	< 0,01
Freshwater	< 0,0001 mg/L	0,019
Freshwater sediment	0,147 mg/kg dry weight	0,193
Soil	< 0,0002 mg/kg dry weight	< 0,01

3.3.2. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,001
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,027

3.3.3. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
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inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg dry weight (MEASE)	< 0,1
combined routes	local			< 1
combined routes	systemic	long-term		0,133

3.3.4. Worker exposure: Small scale handling/transfer of solutions (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,004 mg/kg bw/day	0,013
dermal	systemic	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,039

3.3.5. Worker exposure: Vacuum cleaning (PROC26)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	systemic	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,216

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3.3.6. Worker exposure: Production of metal powders (wet processes) (PROC 27b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,1 mg/m ³ (MEASE)	0,263
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,264

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

If the conditions of downstream use deviate from the measures or parameters described in the exposure scenario, the downstream use can still be considered to be within the conditions of the exposure scenario when the following criteria are met: The resulting risk characterisation ratios (RCR) for the deviating conditions, using the method described in the scenario or a compatible tool ("scaling tool"), have to be equal to or lower than the values given in the exposure scenario. Scalable parameters are restricted to those that a downstream user can actively change by adapting the process, and may vary depending on the method used for exposure assessment. Intrinsic substance properties like vapour pressure or diffusion rates and those parameters specific to the process, e.g. the exposed skin area, may not be scaled.

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ES 4: Use at industrial site - Use in Electroplating or Metal Surface Treatment

4.1. Title section

Exposure Scenario name	: Use at industrial site - Use in Electroplating or Metal Surface Treatment
Structured Short Title	: Use at industrial site - Use in Electroplating or Metal Surface Treatment

Environment		
CS 1	Use at industrial site - Use as an Intermediate	ERC6a
Worker		
CS 2	Use at industrial site - Use in Electroplating or Metal Surface Treatment	PROC2
CS 3	Use at industrial site - Use in Electroplating or Metal Surface Treatment	PROC4
CS 4	Use at industrial site - Use in Electroplating or Metal Surface Treatment	PROC8b
CS 5	Use at industrial site - Use in Electroplating or Metal Surface Treatment	PROC9
CS 6	Use at industrial site - Use in Electroplating or Metal Surface Treatment	PROC13
CS 7	Use at industrial site - Use in Electroplating or Metal Surface Treatment	PROC19

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Use of intermediate with STP (ERC6a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Amount used (or contained in articles), frequency and duration of use/exposure	
Maximum allowable site tonnage (MSafe)	: 48,7 tonnes/year
Critical compartment for Msafe	: Sewage treatment plant
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant
Other conditions affecting environmental exposure	

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Receiving surface water flow	:	93.000 m3/d
Local freshwater dilution factor	:	50

4.2.2. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.3. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374.	

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Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.4. Control of worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: < 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection.	
Dermal - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.5. Control of worker exposure: Small scale handling/transfer of solutions (PROC9)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374.	

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Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.6. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374.	
Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection.	
Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.2.7. Control of worker exposure: Manual activities involving hand contact (PROC19)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: < 4 hrs
Use frequency	: 5 days/week

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Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Use of intermediate with STP (ERC6a)

Release route	Release rate	Release estimation method
Water	40 g/t	
Air	300 g/t	

Protection Target	Exposure estimate	RCR
Sewage treatment plant	> 0,001 mg/L	< 0,01
Freshwater	< 0,001 mg/L	0,019
Freshwater sediment	0,147 mg/kg dry weight	0,193
Soil	< 0,001 mg/kg dry weight	< 0,01

4.3.2. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,001 mg/m ³ (MEASE)	< 0,01
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1

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combined routes	local			< 1
combined routes	systemic	long-term		< 0,01

4.3.3. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,133

4.3.4. Worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 0,01
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		< 0,027

4.3.5. Worker exposure: Small scale handling/transfer of solutions (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³	0,026

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			(MEASE)	
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day	< 1
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,027

4.3.6. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,004 mg/kg bw/day (MEASE)	0,013
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,039

4.3.7. Worker exposure: Manual activities involving hand contact (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	0,034 mg/kg bw/day (MEASE)	0,126
dermal	local	long-term		< 1
dermal	local	short-term		< 1

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combined routes	local			< 1
combined routes	systemic	long-term		0,258

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

If the conditions of downstream use deviate from the measures or parameters described in the exposure scenario, the downstream use can still be considered to be within the conditions of the exposure scenario when the following criteria are met: The resulting risk characterisation ratios (RCR) for the deviating conditions, using the method described in the scenario or a compatible tool ("scaling tool"), have to be equal to or lower than the values given in the exposure scenario. Scalable parameters are restricted to those that a downstream user can actively change by adapting the process, and may vary depending on the method used for exposure assessment. Intrinsic substance properties like vapour pressure or diffusion rates and those parameters specific to the process, e.g. the exposed skin area, may not be scaled.

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ES 5: Use at industrial site - Use as an Intermediate

5.1. Title section

Exposure Scenario name	: Use at industrial site - Use as an Intermediate
Structured Short Title	: Use at industrial site - Use as an Intermediate

Environment		
CS 1	Use at industrial site - Use as an Intermediate	ERC6a
CS 2	Use at industrial site - Use as an Intermediate	ERC6a
Worker		
CS 3	Use at industrial site - Use as an Intermediate	PROC1
CS 4	Use at industrial site - Use as an Intermediate	PROC3
CS 5	Use at industrial site - Use as an Intermediate	PROC4
CS 6	Use at industrial site - Use as an Intermediate	PROC5
CS 7	Use at industrial site - Use as an Intermediate	PROC8a
CS 8	Use at industrial site - Use as an Intermediate	PROC8b
CS 9	Use at industrial site - Use as an Intermediate	PROC8a
CS 10	Use at industrial site - Use as an Intermediate	PROC26
CS 11	Use at industrial site - Use as an Intermediate	PROC8b
CS 12	Use at industrial site - Use as an Intermediate	PROC9
CS 13	Use at industrial site - Use as an Intermediate	PROC9
CS 14	Use at industrial site - Use as an Intermediate	PROC15
CS 15	Use at industrial site - Use as an Intermediate	PROC15
CS 16	Use at industrial site - Use as an Intermediate	PROC26

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Use of intermediate with STP (ERC6a)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.

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Amount used (or contained in articles), frequency and duration of use/exposure	
Maximum allowable site tonnage (MSafe)	: 48,7 tonnes/year
Critical compartment for Msafe	: Sewage treatment plant
Conditions and measures related to sewage treatment plant	
STP type	: Municipal sewage treatment plant
Other conditions affecting environmental exposure	
Receiving surface water flow	: 93.000 m3/d
Local freshwater dilution factor	: 50

5.2.2. Control of environmental exposure: Use of intermediate with direct discharge (ERC6a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Amount used (or contained in articles), frequency and duration of use/exposure	
Maximum allowable site tonnage (MSafe)	: 48,7 tonnes/year
Critical compartment for Msafe	: Freshwater
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: If recycling is not practicable, dispose of in compliance with local regulations.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 93.000 m3/d
Local marine water dilution factor	: 1.000

5.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid

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Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: < 4 hrs
Use frequency	: 5 days/week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 78 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

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5.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days/week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.6. Control of worker exposure: Mixing or blending in batch processes (PROC5)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	

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Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics	
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Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.9. Control of worker exposure: Wet cleaning (PROC8a)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

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5.2.10. Control of worker exposure: Handling of solid inorganic substances at ambient temperature (PROC26)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.11. Control of worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374.	

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Dermal - minimum efficiency of 90 %
Use suitable eye protection.
Wear suitable respiratory protection.
Inhalation - minimum efficiency of 90 %

5.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : solid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : > 4 hrs
Use frequency : 5 days per week
Technical and organisational conditions and measures
Local exhaust ventilation Inhalation - minimum efficiency of 84 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 % Use suitable eye protection. Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %
Other conditions affecting workers exposure
Indoor or outdoor use : Indoor use

5.2.13. Control of worker exposure: Small scale handling/transfer of solutions (PROC9)

Product (article) characteristics
Covers percentage substance in the product up to 100 %.
Physical form of product : Liquid
Amount used (or contained in articles), frequency and duration of use/exposure
Duration : > 4 hrs
Use frequency : 5 days per week

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Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.14. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Dermal - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.15. Control of worker exposure: Laboratory analyses (PROC15)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	

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Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: < 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

5.2.16. Control of worker exposure: Vacuum cleaning (PROC26)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: solid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Technical and organisational conditions and measures	
Local exhaust ventilation Inhalation - minimum efficiency of 84 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Wear suitable respiratory protection. Inhalation - minimum efficiency of 95 %	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

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5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Use of intermediate with STP (ERC6a)

Release route	Release rate	Release estimation method
Water	40 g/t	
Air	300 g/t	

Protection Target	Exposure estimate	RCR
Sewage treatment plant	> 0,001 mg/L	< 0,01
Freshwater	< 0,001 mg/L	0,019
Freshwater sediment	0,147 mg/kg dry weight	0,193
Soil	< 0,001 mg/kg dry weight	< 0,01

5.3.2. Environmental release and exposure: Use of intermediate with direct discharge (ERC6a)

Release route	Release rate	Release estimation method
Water	40 g/t	
Air	300 g/t	

Protection Target	Exposure estimate	RCR
Freshwater	< 0,001 mg/L	< 0,01
Freshwater sediment	0,043 mg/kg dry weight	0,056
Marine water	< 0,001 mg/L	0,08
Marine sediment	0,062 mg/kg dry weight	0,81
Soil	< 0,001 mg/kg dry weight	< 0,01

5.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1

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inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,027

5.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,22 mg/m ³ (MEASE)	0,579
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,58

5.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,2 mg/m ³ (MEASE)	0,526
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,528

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5.3.6. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,2 mg/m ³ (MEASE)	0,526
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,528

5.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,24 mg/m ³ (MEASE)	0,632
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	0,041 mg/kg bw/day (MEASE)	0,152
dermal	local	long-term		< 1
dermal	local	short-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,783

5.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,2 mg/m ³ (MEASE)	0,526
inhalative	local	long-term		< 1

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inhalative	local	short-term		< 1
dermal	systemic	long-term	< 1 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,528

5.3.9. Worker exposure: Wet cleaning (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	0,034 mg/kg bw/day (MEASE)	0,126
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,258

5.3.10. Worker exposure: Handling of solid inorganic substances at ambient temperature (PROC26)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,216

5.3.11. Worker exposure: Handling/ Filling/ Transfer of solutions (PROC8b)

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Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,027

5.3.12. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,32 mg/m ³ (MEASE)	0,842
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,004 mg/kg bw/day (MEASE)	0,013
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,855

5.3.13. Worker exposure: Small scale handling/transfer of solutions (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	long-term		< 1
dermal	systemic	long-term	< 0,004 mg/m ³ (MEASE)	0,013

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dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,039

5.3.14. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,217

5.3.15. Worker exposure: Laboratory analyses (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,01 mg/m ³ (MEASE)	0,026
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,033

5.3.16. Worker exposure: Vacuum cleaning (PROC26)

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Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,08 mg/m ³ (MEASE)	0,211
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,002 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	local			< 1
combined routes	systemic	long-term		0,216

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

If the conditions of downstream use deviate from the measures or parameters described in the exposure scenario, the downstream use can still be considered to be within the conditions of the exposure scenario when the following criteria are met: The resulting risk characterisation ratios (RCR) for the deviating conditions, using the method described in the scenario or a compatible tool ("scaling tool"), have to be equal to or lower than the values given in the exposure scenario. Scalable parameters are restricted to those that a downstream user can actively change by adapting the process, and may vary depending on the method used for exposure assessment. Intrinsic substance properties like vapour pressure or diffusion rates and those parameters specific to the process, e.g. the exposed skin area, may not be scaled.

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Version
6.0

Revision Date:
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Date of last issue: 26.02.2020
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ES 6: Use in electroplating - Professional

6.1. Title section

Exposure Scenario name	: Use in electroplating - Professional
Structured Short Title	: Use in electroplating - Professional

Environment		
CS 1	Use in electroplating - Professional	ERC8c
Worker		
CS 2	Use in electroplating - Professional	PROC2
CS 3	Use in electroplating - Professional	PROC4
CS 4	Use in electroplating - Professional	PROC9
CS 5	Use in electroplating - Professional	PROC13
CS 6	Use in electroplating - Professional	PROC19

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Widespread use leading to inclusion into/onto article (indoor) (ERC8c)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Amount used (or contained in articles), frequency and duration of use/exposure	
Maximum allowable site tonnage (MSafe)	: 0,01 tonnes/year
Critical compartment for Msafe	: Freshwater
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: If recycling is not practicable, dispose of in compliance with local regulations.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 93.000 m3/d

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Local marine water dilution factor	:	1.000
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6.2.2. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics	
Covers percentage substance in the product up to 25 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

6.2.3. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	

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Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use

6.2.4. Control of worker exposure: Small scale handling/transfer of solutions (PROC9)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : > 4 hrs

Use frequency : 5 days per week

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

Dermal - minimum efficiency of 90 %

Use suitable eye protection.

Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use

6.2.5. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics

Covers percentage substance in the product up to 100 %.

Physical form of product : Liquid

Amount used (or contained in articles), frequency and duration of use/exposure

Duration : > 4 hrs

Use frequency : 5 days per week

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

Dermal - minimum efficiency of 90 %

Use suitable eye protection.

Other conditions affecting workers exposure

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Indoor or outdoor use	: Indoor use
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6.2.6. Control of worker exposure: Manual activities involving hand contact (PROC19)

Product (article) characteristics	
Covers percentage substance in the product up to 100 %.	
Physical form of product	: Liquid
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: > 4 hrs
Use frequency	: 5 days per week
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Widespread use leading to inclusion into/onto article (indoor) (ERC8c)

Release route	Release rate	Release estimation method
Water	30.000 g/t	
Air	15.000 g/t	

Protection Target	Exposure estimate	RCR
Sewage treatment plant	8,92 mg/L	< 0,01
Freshwater sediment	0,762 mg/kg dry weight	0,815
Marine water	0,0000244 mg/L	0,08
Marine sediment	0,0762 mg/kg dry weight	0,81
Freshwater	1,55 mg/kg dry weight	< 0,01

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6.3.2. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,001 mg/m ³ (MEASE)	< 0,01
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		< 0,01

6.3.3. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,1 mg/m ³ (MEASE)	0,263
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	< 0,01
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,264

6.3.4. Worker exposure: Small scale handling/transfer of solutions (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,001 mg/kg bw/day (MEASE)	0,013

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dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,144

6.3.5. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	< 0,004 mg/kg bw/day (MEASE)	0,013
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,144

6.3.6. Worker exposure: Manual activities involving hand contact (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,05 mg/m ³ (MEASE)	0,132
inhalative	local	long-term		< 1
inhalative	local	short-term		< 1
dermal	systemic	long-term	0,034 mg/kg bw/day (MEASE)	0,126
dermal	local	long-term		< 1
dermal	local	short-term		< 1
combined routes	systemic	long-term		0,258

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

If the conditions of downstream use deviate from the measures or parameters described in the exposure scenario, the downstream use can still be considered to be within the conditions of the exposure scenario when the following criteria are met: The resulting risk characterisation ratios (RCR) for the deviating conditions, using the method described in the scenario or a compatible tool ("scaling tool"), have to be equal to or lower than the values given in the exposure scenario. Scalable parameters are

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restricted to those that a downstream user can actively change by adapting the process, and may vary depending on the method used for exposure assessment. Intrinsic substance properties like vapour pressure or diffusion rates and those parameters specific to the process, e.g. the exposed skin area, may not be scaled.