

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

1.1 Product identifier

Commercial Product Name
PACL XL10 LQ 5,1%AL HB

1.2 Relevant identified uses of the substance or mixture and uses advised against Use of the Substance/Mixture

Recommended restrictions on use
There are no uses advised against.

1.3 Details of the supplier of the safety data sheet

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1.4 Emergency number

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Centro de Informação Antivenenos (Portugal): +351 808250143 (24 h.)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EU) 1272/2008(CLP) Serious eye damage; Category 1; Causes serious eye damage. Corrosive to metals; Category 1; May be corrosive to metals. **Classification according to EU Directives 67/548/EEC or 1999/45/EC** Irritant; Risk of serious damage to eyes.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

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Hazard pictograms

:



Signal word

: Danger

Hazard statements

: H318 Causes serious eye damage.
H290 May be corrosive to metals.

Precautionary statements

: P264 Wash hands thoroughly after handling.
Prevention:
P261 Avoid breathing spray.
P280 Wear protective gloves/ eye protection/ face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/ physician.
Storage:
P406 Store in corrosive resistant container with a resistant inner liner.

Hazardous components which must be listed on the label:

- 39290-78-3 Aluminium chloride hydroxide sulfate

2.3 Other hazards

Advice; Small amounts of hydrogen chloride may be released at temperatures above the boiling point.

Potential environmental effects; May lower the pH of water and thus be harmful to aquatic organisms.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Chemical nature of the mixture

Aqueous solution

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| CAS/EU number/REACH Registration Number | Chemical name of the substance | Concentration | Classification according to Regulation (EU) 1272/2008(CLP) | Classification according to EU Directives 67/548/EEC or 1999/45/EC |
|---|--------------------------------------|---------------|--|--|
| 39290-78-3 254-400-7 01-2119531540-51 | Aluminium chloride hydroxide sulfate | 10 - 25 % | Eye Dam. Category 1,H318 Met. Corr. Category 1,H290 | Xi ,R41 |

Further information

For the full text of the R-phrases mentioned in this Section, see Section 16.

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Show this safety data sheet to the doctor in attendance.

Inhalation

Move to fresh air.

Skin contact

Rinse with plenty of water. If symptoms persist, call a physician.

Eye contact

Rinse immediately with plenty of water, also under the eyelids, for at least 10 minutes. If possible use lukewarm water. Consult a physician.

Ingestion

Rinse mouth with water. Drink 1 or 2 glasses of water. If symptoms persist, call a physician.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : corrosive effects, May cause irreversible eye damage.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Rinse with plenty of water.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Extinguishing media : Not combustible.
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : No special requirements.

5.2 Special hazards arising from the substance or mixture

Small amounts of hydrogen chloride may be released at temperatures above the boiling point. Thermal decomposition products: hydrogen chloride (HCl) Sulphur oxides (SOx)

5.3 Advice for firefighters

Exposure to decomposition products may be a hazard to health. In the event of fire, wear self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For personal protection see section 8.

6.2 Environmental precautions

Restrict the spread of the spillage by using inert absorbent material (sand, gravel). Cover the drains. Must be disposed of in accordance with local and national regulations.

6.3 Methods and materials for containment and cleaning up

Clean-up methods - small spillage

Dilute residues with water and then neutralize with lime or limestone powder to a solid consistency. Shovel or sweep up. Must be disposed of in accordance with local and national regulations.

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Clean-up methods - large spillage

Remove spill using a vacuum truck. Dilute residues with water and then neutralize with lime or limestone powder to a solid consistency. Shovel or sweep up remaining material. Must be disposed of in accordance with local and national regulations.

6.4 Reference to other sections

Inform the rescue service in case of entry into waterways, soil or drains.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

For personal protection see section 8. The work place and work methods shall be organized in such a way that direct contact with the product is prevented or minimized.

Small amounts of hydrogen chloride may be released at temperatures above the boiling point.

7.2 Conditions for safe storage, including any incompatibilities

For quality reasons:

Keep at temperatures below 30 °C.

Keep at temperatures above 0 °C. Handling operations become difficult due to increased viscosity.

Materials for packaging

Suitable material: plastic (PE, PP, PVC), polyester with fibreglass reinforcement, rubber-coated steel,

titanium

Materials to avoid:

chlorites, hypochlorites, sulphites, galvanized surfaces, Iron, sodium hydroxide

Storage stability:

Storage period 12 Months

7.3 Specific end use(s)

Water treatment chemical

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Limit values in other countries

Finland:

Aluminium chloride hydroxide sulfate

TWA = 1 mg/m³, Calculated as Al

Sweden:

Aluminium chloride hydroxide sulfate

NGV = 1 mg/m³, Calculated as Al

Germany:

Aluminium chloride hydroxide sulfate

MAK = 4 mg/m³, inhalable fraction, Calculated as Al

MAK = 1,5 mg/m³, respirable fraction, Calculated as Al

MAK = 0,2 mg/m³, Calculated as Al

Belgium:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³, Calculated as Al

Switzerland:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³, inhalable fraction

Denmark:

Aluminium chloride hydroxide sulfate

TWA = 1 mg/m³, Calculated as Al

Estonia:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³

Spain:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³, Calculated as Al

France:

Aluminium chloride hydroxide sulfate

VME = 2 mg/m³, Calculated as Al

Great Britain:

Aluminium chloride hydroxide sulfate

TWA = 1 mg/m³

Greece:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³

Ireland:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³, Calculated as Al

Lithuania:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³

Netherlands:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³

Norway:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³, Calculated as Al

Portugal:

Aluminium chloride hydroxide sulfate

TWA = 2 mg/m³, Calculated as Al

DNEL

Aluminium chloride hydroxide : End Use: Workers
sulfate

Exposure routes: oral

Potential health effects: Long-term exposure - systemic effects

Value: 0,5 mg/kg bw/day

Calculated as Al

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End Use: Workers
Exposure routes: Inhalation
Potential health effects: Long-term exposure - systemic effects
Value: 1,8 mg/m³
Calculated as AI

End Use: Consumers
Exposure routes: oral
Potential health effects: Long-term exposure - systemic effects
Value: 0,3 mg/kg bw/day
Calculated as AI

End Use: Consumers
Exposure routes: Inhalation
Potential health effects: Long-term exposure - systemic effects
Value: 1,1 mg/m³
Calculated as AI

PNEC

Aluminium chloride hydroxide sulfate : Sewage treatment plant
The PNEC value would be highly depending on conditions as pH and organic matter, and therefore a true PNEC cannot and does not need to be derived.

Oral
Bioaccumulative potential, Secondary poisoning, not significant, Derivation of the PNEC, Not relevant

Soil
study scientifically unjustified

Water
Not relevant, The compound is considered to have no long term effects in aquatic systems due to the rapid formation of insoluble hydroxides.

,The PNEC value would be highly depending on conditions as pH and organic matter, and therefore a true PNEC cannot and does not need to be derived.

Air
Not relevant

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice.

Eye wash bottle or emergency eye-wash fountain must be found in the work place.

8.2.2 Individual protection measures, such as personal protective equipment Hand protection

Glove material: PVC and neoprene gloves

Protective gloves complying with EN 374.

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. Gloves should be removed and replaced immediately if there is any indication of degradation or chemical breakthrough.

Break through time: > 480 min

Eye protection

Eye wash bottle with pure water Tightly fitting safety goggles.

Skin and body protection

Wear protective clothing if necessary. Use rubber boots.

Respiratory protection

Respiratory protection is not required under normal handling conditions. If aerosols or mist are formed, eg. when cleaning containers with a high pressure washer, use half mask with dust filter P2.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General Information (appearance, odour)

| | |
|----------------|------------------|
| Physical state | liquid, |
| Colour | Yellowish, clear |
| Odour | not significant |

Important health safety and environmental information

| | |
|-----------------------------|--------------|
| pH | ca. 3 |
| Crystallisation point/range | -15 °C |
| Boiling point/boiling range | 105 - 115 °C |

Flash point

Not applicable, inorganic compound
8/46

Flammability (solid, gas)

In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.
The product is not flammable.

Explosive properties:

Density

1,18 - 1,22 g/cm³

Solubility(ies):

Water solubility

(20 °C)
completely soluble

Partition coefficient: n-octanol/water

Not applicable, inorganic compound

Thermal decomposition

In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.

Oxidising

> 200 °C

Not oxidizing

9.2 Other data

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

May be corrosive to metals.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : Contact with certain metals (e.g. aluminium, zinc) may form explosive gas mixtures with air.

10.4 Conditions to avoid

Conditions to avoid : High temperatures.
Avoid freezing.

10.5 Incompatible materials

Materials to avoid : chlorites
hypochlorites
sulphites
galvanized surfaces
Iron

sodium hydroxide

10.6 Hazardous decomposition products

Hazardous decomposition products : Thermal decomposition products:
hydrogen chloride (HCl)
Sulphur oxides (SOx)

Thermal decomposition : >200 °C

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Low order of acute toxicity.

Aluminium chloride hydroxide sulfate:

LD50/Oral/Rat: 2 360 mg/kg

LC50/Inhalation/4 h/Rat: > 5 mg/l

LD50/Dermal/Rat/male and female: > 2 000 mg/kg

Irritation and corrosion

Skin:

Repeated or prolonged skin contact may cause: Skin irritation dry skin

Eyes:

May cause irreversible eye damage.

Aluminium chloride hydroxide sulfate:

Skin: Rabbit/OECD Test Guideline 404: No irritating effects.

Eyes: Rabbit/72 h/OECD Test Guideline 405: No eye irritation

Sensitisation

Remarks: The data is based on the toxicological properties of individual components of the product.
Not sensitizing.

Aluminium chloride hydroxide sulfate:

Guinea pig/OECD Test Guideline 406

Remarks: Read-across (Analogy) CAS-No. 12042-91-0 Not sensitizing.

Long term toxicity

Aluminium chloride hydroxide sulfate:

Repeated dose toxicity:

Oral/Rat/OECD Test Guideline 422:

NOAEL: 327 mg/kg

Remarks: bw/day Systemic toxicity Read-across (Analogy) CAS-No. 1327-41-9

NOAEL: 90 mg/kg

Remarks: bw/day Calculated as Al

Oral/Rat/OECD Test Guideline 422:

NOAEL: 65 mg/kg

Remarks: bw/day Local effects Read-across (Analogy) CAS-No. 1327-41-9

NOAEL: 18 mg/kg

Remarks: bw/day Calculated as Al

Dermal:

Remarks: study scientifically unjustified

Inhalation/Rat/OECD Test Guideline 413:

Remarks: Subchronic toxicity Read-across (Analogy) CAS-No. 12042-91-0

Remarks: Calculated as Al

Carcinogenicity

Not believed to be a carcinogen.

Mutagenicity

Mutagenicity (Salmonella typhimurium - reverse mutation assay)/AMES test/OECD Test Guideline 471:

Result: negative

Metabolic activation: with and without

In vitro mammalian cells/micronucleus test/OECD Test Guideline 487:

Result: negative

Metabolic activation: with and without

Remarks: Read-across (Analogy) 1327-41-9

In vitro gene mutation study in mammalian cells/Lymphoma/OECD Test Guideline 476:
Result: negative
Metabolic activation: with and without
Remarks: Read-across (Analogy) 1327-41-9

Reproductive toxicity

Oral/Rat/female/Reproductive effects/OECD Test Guideline 452:
NOAEL: 3 225 mg/kg
NOAEL F1:
Remarks: Read-across (Analogy) CAS-No. 31142-56-0
No known effect.

Oral/Rat/male and female/Screening test/OECD Test Guideline 422:
NOAEL: 1 000 mg/kg
NOAEL F1:
Remarks: Read-across (Analogy) 1327-41-9
No known effect.

Not believed to be toxic for reproduction.

Teratogenicity

Oral/Rat/OECD Test Guideline 452:
NOAEL: 1 075 mg/kg
Read-across (Analogy) Did not show mutagenic or teratogenic effects in animal experiments. CAS-No. 31142-56-0

Human experience

Inhalation

Symptoms: Inhalation may provoke the following symptoms:, cough and difficulties in breathing

Skin contact

Symptoms: Repeated or prolonged skin contact may cause:, dry skin, irritation

Eye contact

Symptoms: Contact with eyes causes a smarting pain and a flood of tears.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Aquatic toxicity

—

This material is not classified as dangerous for the environment. At environmentally relevant pH 5,5 – 8, the solubility of aluminium is low. Aluminium salts dissociate with water resulting in rapid formation and precipitation of aluminium hydroxides. At pH <5.5, the free ion (Al^{3+}) becomes the prevalent form, the increased availability at this pH is reflected in higher toxicity. At pH 6.0–7.5, solubility declines due to the presence of insoluble $Al(OH)_3$. At higher pH (pH >8.0), the more soluble $Al(OH)_4^-$ species predominate, which again increases availability.

Aluminium salts must not be released to rivers and lakes in an uncontrolled way and pH variations around 5 - 5.5 should be avoided.

Aluminium chloride hydroxide sulfate:

LC50/96 h/Danio rerio/semi-static test/OECD Test Guideline 203: > 1 000 mg/l

Remarks: Read-across (Analogy), CAS-No., 1327-41-9

NOEC/Danio rerio/semi-static test/OECD Test Guideline 203: > 1 000 mg/l

Remarks: Read-across (Analogy), CAS-No., 1327-41-9

LC50/Danio rerio/semi-static test/OECD Test Guideline 203: > 0,156 mg/l

Calculated as Al Maximum soluble concentration under the test conditions.

EC50/48 h/Daphnia magna (Water flea)/OECD Test Guideline 202: 98 mg/l

Remarks: Read-across (Analogy), CAS-No., 1327-41-9

NOEC/Daphnia magna (Water flea)/OECD Test Guideline 202: 24 mg/l

Remarks: Read-across (Analogy), CAS-No., 1327-41-9

EC50/72 h/Pseudokirchneriella subcapitata (green algae)/static test/OECD Test Guideline 201: 14 mg/l

EC50: 3,4 mg/l

Calculated as Al

NOEC/72 h/Pseudokirchneriella subcapitata (green algae)/static test/OECD Test Guideline 201: 1 mg/l

NOEC: 0,24 mg/l

Calculated as Al

Toxicity to other organisms

12.2 Persistence and degradability

Biological degradability:

The methods for determining the biological degradability are not applicable to inorganic substances.

Chemical degradation:

When reacting with water on pH range 5,8 - 8 precipitates of aluminium hydroxides are formed.

Biological degradability:

Aluminium chloride hydroxide sulfate:

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

The product is not expected to bioaccumulate.

Partition coefficient: n-octanol/water: Not applicable, inorganic compound

Partition coefficient: n-octanol/water: In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.

Aluminium chloride hydroxide sulfate:

The product is not expected to bioaccumulate.

Partition coefficient: n-octanol/water: Not applicable, inorganic compound

12.4.Mobility in soil

Mobility

Water solubility: completely soluble (20 °C)

12.5. Results of PBT and vPvB assessment

This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT).

This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).

12.6 Other adverse effects

May lower the pH of water and thus be harmful to aquatic organisms.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Classified as hazardous waste.Must be disposed of in accordance with local and national regulations.
Thoroughly cleaned packaging material may be recycled.

Contaminated packaging

Classified as hazardous waste. Must be disposed of in accordance with local and national regulations.

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SECTION 14: TRANSPORT INFORMATION

14.1 UN number 3264

Land transport

ADR:

Description of the goods:

14.2 UN proper shipping name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Aluminium chloride hydroxide sulfate)

14.3 Transport hazard class(es) 8

14.4 Packing group: III

Classification code: C1

Risk code 80

ADR/RID-Labels: 8

Sea transport

IMDG:

Description of the goods:

14.2 UN proper shipping name UN3264, CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (ALUMINIUM CHLORIDE HYDROXIDE SULFATE)

14.3 Transport hazard class(es): 8

14.4 Packing group: III

IMDG-Labels: 8

14.5 Environmental hazards: Not a Marine Pollutant

Air transport

ICAO/IATA:

Description of the goods

14.2 UN proper shipping name UN3264, Corrosive liquid, acidic, inorganic, n.o.s. (Aluminium chloride hydroxide sulfate)

14.3 Transport hazard class(es): 8

14.4 Packing group: III

ICAO-Labels: 8

14.8 Special precautions for user

The product is classified as dangerous goods, as it is slightly corrosive to metals.

SECTION 15: REGULATORY INFORMATION

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

Notification status

:
:
:
:
:
:

15.2 Chemical Safety Assessment

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under section 3.

H318 Causes serious eye damage.

H290 May be corrosive to metals.

Text of R-phrases mentioned in Section 3

R41 Risk of serious damage to eyes.

Training advice

Read the safety data sheet before using the product.

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.

Sources of key data used to compile the Safety Data Sheet

Regulations, databases, literature, own tests.

Additions, Deletions, Revisions

Relevant changes have been marked with vertical lines.

Annex

Contents: Exposure scenario

1. ES 2., Formulation and distribution, Aqueous solution

SU 3; SU 10; ERC2; PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC19;

2. ES 3., Use of substance in synthesis as a process chemical and as an intermediate.

4. Aqueous solution

SU 3; SU6b, SU8, SU9, SU14; ERC1, ERC2, ERC4, ERC5, ERC6a, ERC8a; PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15;

5. ES 4., Spraying formulations., Aqueous solution

SU 3; SU5, SU6b, SU7; ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC8a, ERC8b, ERC8c, ERC8f, ERC10a, ERC11a; PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC11, PROC19;

6. ES 5., Non-spraying formulations., Aqueous solution

SU 3; SU1, SU5, SU6b, SU7, SU13, SU19; ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC8a, ERC8b, ERC8c, ERC8f, ERC10a, ERC11a; PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19;

7. ES 6., Flocculant or coagulant in water and waste water treatment., Aqueous solution

SU 3; SU2, SU5, SU6b, SU 10, SU23; ERC2, ERC4, ERC6b, ERC8a, ERC8b, ERC8d; PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19;

8. ES 7., Laboratory chemicals, Industrial use, Professional use, Aqueous solution

SU 3; SU9; ERC4; PROC15;

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1. Short title of Exposure Scenario: ES 2., Formulation and distribution, Aqueous solution

| | |
|--------------------------------|---|
| Main User Groups | : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Sector of use | : SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) |
| Process category | : PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available |
| Environmental release category | : ERC2: Formulation of preparations |

2.1 Contributing scenario controlling environmental exposure for: ERC2

Product characteristics

| | |
|---|---|
| Concentration of the Substance in Mixture/Article | : Covers the percentage of the substance in the product up to 100 % (unless stated differently). |
|---|---|

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Technical conditions and measures / Organizational measures

| | |
|---------|---|
| Remarks | : Aluminum, aluminum powders, aluminum oxide and soluble aluminum compounds are non-hazardous (not classified for the environment). Aluminum (Al) is the most commonly occurring metallic element, comprising eight percent of the earth's crust and is therefore found in great abundance in both the terrestrial and sediment environments. Concentrations of 3-8% (30,000-80,000 ppm) are not uncommon. The relative contributions of anthropogenic aluminum to the existing natural pools of aluminum in soils and sediments is very small, and therefore, not relevant either in terms of added amounts or in terms of toxicity. |
|---------|---|

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC19

Product characteristics

| | |
|---|--|
| Concentration of the Substance in Mixture/Article | Covers the percentage of the substance in the product up to 100 % (unless stated differently). |
| Physical Form (at time of use) | : Aqueous solution |
| Vapour pressure | : < 0,1 hPa |

Amount used

| | |
|---------|--|
| Remarks | : Varies between ml and m ³ |
|---------|--|

Frequency and duration of use

| | |
|---------|---|
| Remarks | : Covers daily exposures up to 8 hours (unless stated differently). |
|---------|---|

Other operational conditions affecting workers exposure

| | |
|---------|---|
| Remarks | : Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational hygiene is implemented., Ensure operatives are trained to minimise exposures. |
|---------|---|

Technical conditions and measures

Process categories, 1, 2, 3, Handle substance within a closed system., Clear transfer lines prior to de-coupling.

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Organisational measures to prevent /limit releases, dispersion and exposure

Process categories, 1, 2, 3, 4, 8a, 8b, 14, 15, No specific measures identified. Clear spills immediately., Clean equipment and the work area every day. Process categories, 19, Industrial use 5-25%:, Avoid carrying out operation for more than 1 hour. 1-5%:, Avoid carrying out operation for more than 4 hours. <1%:, No specific measures identified. Process categories, 19, Professional use 5-25%:, Avoid carrying out operation for more than 15 minutes. or Wear respiratory protection. 1-5%:, Avoid carrying out operation for more than 1 hour. <1%:, Avoid carrying out operation for more than 4 hours.

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

Use suitable eye protection and gloves., Wear suitable gloves tested to EN374., 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. Process category, 19, Professional use 5-25%:, Wear a respirator conforming to EN140 with Type A/P2 filter or better.

3. Exposure estimation and reference to its source

Workers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|--|---------------------|------------------------|---|
| PROC19 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, <1%:, TRA duration factor > 4 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

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| | | | | | |
|--------|------------|---|---------------------|------------------------|------|
| | | < 15 min | | | |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, Half mask | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, <1%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0.

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1. Short title of Exposure Scenario: ES 3., Use of substance in synthesis as a process chemical and as an intermediate.
Aqueous solution

- | | |
|--------------------------------|--|
| Main User Groups | : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Sector of use | : SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU14: Manufacture of basic metals, including alloys |
| Process category | : PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent |
| Environmental release category | : ERC1: Manufacture of substances ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC8a: Wide dispersive indoor use of processing aids in open systems |

2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC4, ERC5, ERC6a, ERC8a

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Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Technical conditions and measures / Organizational measures

Remarks : Aluminum, aluminum powders, aluminum oxide and soluble aluminum compounds are non-hazardous (not classified for the environment). Aluminum (Al) is the most commonly occurring metallic element, comprising eight percent of the earth's crust and is therefore found in great abundance in both the terrestrial and sediment environments. Concentrations of 3-8% (30,000-80,000 ppm) are not uncommon. The relative contributions of anthropogenic aluminum to the existing natural pools of aluminum in soils and sediments is very small, and therefore, not relevant either in terms of added amounts or in terms of toxicity.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PC20, PC21, PC26, PC19

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Aqueous solution
Vapour pressure : < 0,1 hPa

Amount used

Remarks : Varies between ml and m³

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational

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hygiene is implemented., Ensure operatives are trained to minimise exposures.

Technical conditions and measures

Process categories, 1, 2, 3, Handle substance within a closed system., Clear transfer lines prior to de-coupling.

Organisational measures to prevent /limit releases, dispersion and exposure

Process categories, 1, 2, 3, 4, 8b, 15, No specific measures identified.Clear spills immediately.

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

Use suitable eye protection and gloves., Wear suitable gloves tested to EN374., 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.

3. Exposure estimation and reference to its source

Workers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|----------------------------------|------------|-------------------|---|
| | ECETOC TRA | No specific measures identified. | | | < 1 |

Consumers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | RCR |
|-----------------------|----------------------------|----------------------------------|------------|-------------------|-----|
| | ECETOC TRA | No specific measures identified. | | | < 1 |

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0.

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1. Short title of Exposure Scenario: ES 4., Spraying formulations., Aqueous solution

| | |
|--------------------------------|---|
| Main User Groups | : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Sector of use | : SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media |
| Process category | : PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC11: Non industrial spraying PROC19: Hand-mixing with intimate contact and only PPE available |
| Environmental release category | : ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix |

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ERC10a: Wide dispersive outdoor use of long-life articles and materials with low release

ERC11a: Wide dispersive indoor use of long-life articles and materials with low release

2.1 Contributing scenario controlling environmental exposure for: ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC8a, ERC8b, ERC8c, ERC8f, ERC10a, ERC11a

Product characteristics

| | |
|---|--|
| Concentration of the Substance in Mixture/Article | : Covers the percentage of the substance in the product up to 100 % (unless stated differently). |
|---|--|

Technical conditions and measures / Organizational measures

| | |
|---------|---|
| Remarks | : Aluminum, aluminum powders, aluminum oxide and soluble aluminum compounds are non-hazardous (not classified for the environment). Aluminum (Al) is the most commonly occurring metallic element, comprising eight percent of the earth's crust and is therefore found in great abundance in both the terrestrial and sediment environments. Concentrations of 3-8% (30,000-80,000 ppm) are not uncommon. The relative contributions of anthropogenic aluminum to the existing natural pools of aluminum in soils and sediments is very small, and therefore, not relevant either in terms of added amounts or in terms of toxicity. |
|---------|---|

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC11, PROC19, PC9a, PC19, PC20, PC21, PC23, PC26, PC34, PC35

Product characteristics

| | |
|---|--|
| Concentration of the Substance in Mixture/Article | : Covers the percentage of the substance in the product up to 100 % (unless stated differently). |
| Physical Form (at time of use) | : Aqueous solution |
| Vapour pressure | : < 0,1 hPa |

Amount used

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Remarks : Varies between ml and m³

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational hygiene is implemented., Ensure operatives are trained to minimise exposures.

Technical conditions and measures

Process categories, 1, 2, 3, Handle substance within a closed system.
 Process categories, 7, Industrial use, Professional use
 5-25%:, Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20., or, Avoid carrying out operation for more than 1 hour.
 1-5%:, Local exhaust ventilation and/or general ventilation is good practice.
 <1%:, Limit the substance content in the product to 1 %.
 Process categories, 11, Industrial use, Professional use
 5-25%:, Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.
 1-5%:, Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.

Organisational measures to prevent /limit releases, dispersion and exposure

Process categories, 1, 2, 3, 5, 8a, 8b, 9, No specific measures identified., Clean equipment and the work area every day., Clear spills immediately.Process categories, 7, Industrial use, Professional use5-25%:, Wear respiratory protection.1-5%:, Wear respiratory protection., Avoid carrying out operation for more than 4 hours.<1%:, Avoid carrying out operation for more than 15 minutes., or, Wear respiratory protection.Process categories, 11, Industrial use, Professional use5-25%:, Wear respiratory protection., or, Avoid carrying out operation for more than 1 hour.1-5%:, Avoid carrying out operation for more than 4 hours.<1%:, Avoid carrying out operation for more than 15 minutes.Process categories, 19, Industrial use5-25%:, Avoid carrying out operation for more than 1 hour.1-5%:, Avoid carrying out operation for

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more than 4 hours.<1%:, No specific measures identified.Process categories, 19, Professional use5-25%:, Wear respiratory protection., or, Avoid carrying out operation for more than 15 minutes.1-5%:, Avoid carrying out operation for more than 1 hour.<1%:, Avoid carrying out operation for more than 4 hours.

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

Use suitable eye protection and gloves., Wear suitable gloves tested to EN374., 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.Process category, 7, Professional use5-25%:, Wear a respirator conforming to EN140 with Type A/P2 filter or better.1-5%:, Wear a respirator conforming to EN140 with Type A/P2 filter or better.Process category, 195-25%:, Wear a respirator conforming to EN140 with Type A/P2 filter or better.

3. Exposure estimation and reference to its source

Workers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|--|---------------------|------------------------|---|
| PROC7 | ECETOC TRA | Industrial use, 5-25%:, Half mask, 90 %, (with LEV) | Inhalation exposure | 0,67 mg/m ³ | 0,37 |
| PROC7 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h, Half mask | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC7 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h, 90 %, (with LEV) | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC7 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h, Half mask | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC7 | ECETOC TRA | Industrial use, <1%:, < 15 min | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC11 | ECETOC TRA | Professional | Inhalation | 1,35 mg/m ³ | 0,75 |

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| | | | | | |
|--------|------------|---|------------------------|------------------------|------|
| | | use, 5-25%:, Half mask, 80 %, (with LEV) | exposure | | |
| PROC11 | ECETOC TRA | Professional use, 5-25%:, < 15 min, 80 %, (with LEV) | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC11 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h, 80 %, (with LEV) | Inhalation exposure | 0,90 mg/m ³ | 0,50 |
| PROC11 | ECETOC TRA | Professional use, <1%:, < 15 min | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, <1%:, TRA duration factor > 4 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, < 15 min | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, Half mask | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, <1%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

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Consumers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | RCR |
|-----------------------|----------------------------|---|---------------------|------------------------|------|
| PROC7 | ECETOC TRA | Industrial use, 5-25%:, Half mask, 90 %, (with LEV) | Inhalation exposure | 0,67 mg/m ³ | 0,37 |
| PROC7 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h, Half mask | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC7 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h, 90 %, (with LEV) | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC7 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h, Half mask | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC7 | ECETOC TRA | Industrial use, <1%:, < 15 min | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC11 | ECETOC TRA | Professional use, 5-25%:, Half mask, 80 %, (with LEV) | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC11 | ECETOC TRA | Professional use, 5-25%:, < 15 min, 80 %, (with LEV) | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC11 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h, 80 %, (with LEV) | Inhalation exposure | 0,90 mg/m ³ | 0,50 |
| PROC11 | ECETOC TRA | Professional use, <1%:, < 15 min | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, <1%:, TRA duration factor > 4 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, < 15 min | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, Half mask | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

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| | | | | | |
|--------|------------|---|---------------------|------------------------|------|
| PROC19 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, <1%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0.

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1. Short title of Exposure Scenario: ES 5., Non-spraying formulations., Aqueous solution

- Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
- Sector of use : **SU1:** Agriculture, forestry, fishery
SU5: Manufacture of textiles, leather, fur
SU6b: Manufacture of pulp, paper and paper products
SU7: Printing and reproduction of recorded media
SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement
SU19: Building and construction work
- Process category : **PROC1:** Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
PROC6: Calendering operations
PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10: Roller application or brushing
PROC13: Treatment of articles by dipping and pouring
PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15: Use as laboratory reagent
PROC19: Hand-mixing with intimate contact and only PPE available
- Environmental release category : **ERC2:** Formulation of preparations
ERC3: Formulation in materials
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
ERC5: Industrial use resulting in inclusion into or onto a matrix

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ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

ERC6b: Industrial use of reactive processing aids

ERC8a: Wide dispersive indoor use of processing aids in open systems

ERC8b: Wide dispersive indoor use of reactive substances in open systems

ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix

ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

ERC10a: Wide dispersive outdoor use of long-life articles and materials with low release

ERC11a: Wide dispersive indoor use of long-life articles and materials with low release

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC8a, ERC8b, ERC8c, ERC8f, ERC10a, ERC11a

Product characteristics

| | | |
|---|---|--|
| Concentration of the Substance in Mixture/Article | : | Covers the percentage of the substance in the product up to 100 % (unless stated differently). |
|---|---|--|

Technical conditions and measures / Organizational measures

| | | |
|---------|---|---|
| Remarks | : | Aluminum, aluminum powders, aluminum oxide and soluble aluminum compounds are non-hazardous (not classified for the environment). Aluminum (Al) is the most commonly occurring metallic element, comprising eight percent of the earth's crust and is therefore found in great abundance in both the terrestrial and sediment environments. Concentrations of 3-8% (30,000-80,000 ppm) are not uncommon. The relative contributions of anthropogenic aluminum to the existing natural pools of aluminum in soils and sediments is very small, and therefore, not relevant either in terms of added amounts or in terms of toxicity. |
|---------|---|---|

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2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PC1, PC9a, PC12, PC19, PC20, PC21, PC23, PC26, PC34, PC35

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Aqueous solution
Vapour pressure : < 0,1 hPa

Amount used

Remarks : Varies between ml and m³

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational hygiene is implemented., Ensure operatives are trained to minimise exposures.

Technical conditions and measures

Process categories, 1, 2, 3, Handle substance within a closed system.

Process categories, 10, Industrial use

5-25%.: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20., or, Wear respiratory protection.

Process categories, 10, Professional use

5-25%.: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20., or, Wear respiratory protection.

1-5%.: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20., or, Avoid carrying out operation for more than 1 hour.

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<1%: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings., Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.

Organisational measures to prevent /limit releases, dispersion and exposure

Process categories, 1, 2, 3, 4, 5, 6, 8a, 8b, 9, 13, 14, 15, No specific measures identified., Clean equipment and the work area every day., Clear spills immediately.Process categories, 19, Industrial use5-25%: Avoid carrying out operation for more than 1 hour.1-5%: Avoid carrying out operation for more than 4 hours.<1%: No specific measures identified.Process categories, 19, Professional use5-25%: Wear respiratory protection., or, Avoid carrying out operation for more than 15 minutes.1-5%: Avoid carrying out operation for more than 1 hour.<1%: Avoid carrying out operation for more than 4 hours.Process categories, 10, Industrial use5-25%: Wear respiratory protection., or, Avoid carrying out operation for more than 1 hour.1-5%: Avoid carrying out operation for more than 4 hours.<1%: No specific measures identified.Process categories, 10, Professional use5-25%: Avoid carrying out operation for more than 4 hours., Wear respiratory protection.1-5%: Avoid carrying out operation for more than 1 hour.

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

Use suitable eye protection and gloves., Wear suitable gloves tested to EN374., 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.Process category, 195-25%: Wear a respirator conforming to EN140 with Type A filter or better.Process category, 10, Professional use5-25%: Wear a respirator conforming to EN140 with Type A/P2 filter or better.

3. Exposure estimation and reference to its source

Workers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|---|---------------------|------------------------|---|
| PROC10 | ECETOC TRA | Industrial use, 5-25%: 80 %, (with LEV) | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC10 | ECETOC TRA | Industrial use, 5-25%: Half mask | Inhalation exposure | 0,67 mg/m ³ | 0,37 |
| PROC10 | ECETOC TRA | Industrial use, 5-25%: TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC10 | ECETOC TRA | Industrial use, 1-5%: TRA duration | Inhalation exposure | 1,35 mg/m ³ | 0,75 |

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| | | | | | |
|--------|------------|--|---------------------|------------------------|------|
| | | factor 1 - 4 h | | | |
| PROC10 | ECETOC TRA | Industrial use, <1%: | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC10 | ECETOC TRA | Professional use, 5-25%:, TRA duration factor 15 min - 1 h, 80 %, (with LEV) | Inhalation exposure | 0,67 mg/m ³ | 0,37 |
| PROC10 | ECETOC TRA | Professional use, 5-25%:, TRA duration factor 1 - 4 h, Half mask | Inhalation exposure | 1,01 mg/m ³ | 0,56 |
| PROC10 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 0,90 mg/m ³ | 0,50 |
| PROC10 | ECETOC TRA | Professional use, 1-5%:, 80 %, (with LEV) | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC10 | | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC10 | | Professional use, <1%:, 80 %, (with LEV) | Inhalation exposure | 0,56 mg/m ³ | 0,31 |
| PROC19 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, <1%:, TRA duration factor > 4 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

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| | | | | | |
|--------|------------|---|---------------------|------------------------|------|
| | | < 15 min | | | |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, Half mask | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, <1%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

Consumers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | RCR |
|-----------------------|----------------------------|--|---------------------|------------------------|------|
| PROC10 | ECETOC TRA | Industrial use, 5-25%:, 80 %, (with LEV) | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC10 | ECETOC TRA | Industrial use, 5-25%:, Half mask | Inhalation exposure | 0,67 mg/m ³ | 0,37 |
| PROC10 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC10 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC10 | ECETOC TRA | Industrial use, <1%: | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC10 | ECETOC TRA | Professional use, 5-25%:, TRA duration factor 15 min - 1 h, 80 %, (with LEV) | Inhalation exposure | 0,67 mg/m ³ | 0,37 |
| PROC10 | ECETOC TRA | Professional use, 5-25%:, TRA duration factor 1 - 4 h, Half mask | Inhalation exposure | 1,01 mg/m ³ | 0,56 |
| PROC10 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 0,90 mg/m ³ | 0,50 |
| PROC10 | ECETOC TRA | Professional use, 1-5%:, 80 %, (with LEV) | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC10 | | Professional use, 1-5%:, TRA duration | Inhalation exposure | 1,12 mg/m ³ | 0,62 |

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| | | | | | |
|--------|------------|---|---------------------|------------------------|------|
| | | factor 15 min - 1 h | | | |
| PROC10 | | Professional use, <1%:, 80 %, (with LEV) | Inhalation exposure | 0,56 mg/m ³ | 0,31 |
| PROC19 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, <1%:, TRA duration factor > 4 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, < 15 min | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, Half mask | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, <1%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0.

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1. Short title of Exposure Scenario: ES 6., Flocculant or coagulant in water and waste water treatment., Aqueous solution

- Main User Groups : **SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
- Sector of use : **SU2:** Mining, (including offshore industries)
SU5: Manufacture of textiles, leather, fur
SU6b: Manufacture of pulp, paper and paper products
SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
SU23: Electricity, steam, gas water supply and sewage treatment
- Process category : **PROC2:** Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC19: Hand-mixing with intimate contact and only PPE available
- Environmental release category : **ERC2:** Formulation of preparations
ERC4: Industrial use of processing aids in processes and products, not becoming part of articles
ERC6b: Industrial use of reactive processing aids
ERC8a: Wide dispersive indoor use of processing aids in open systems
ERC8b: Wide dispersive indoor use of reactive substances in open systems
ERC8d: Wide dispersive outdoor use of processing aids in open systems

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2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6b, ERC8a, ERC8b, ERC8d

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Technical conditions and measures / Organizational measures

Remarks : Aluminum, aluminum powders, aluminum oxide and soluble aluminum compounds are non-hazardous (not classified for the environment). Aluminum (Al) is the most commonly occurring metallic element, comprising eight percent of the earth's crust and is therefore found in great abundance in both the terrestrial and sediment environments. Concentrations of 3-8% (30,000-80,000 ppm) are not uncommon. The relative contributions of anthropogenic aluminum to the existing natural pools of aluminum in soils and sediments is very small, and therefore, not relevant either in terms of added amounts or in terms of toxicity.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19, PC20, PC21, PC37

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Aqueous solution
Vapour pressure : < 0,1 hPa

Amount used

Remarks : Varies between ml and m³

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

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Other operational conditions affecting workers exposure

Remarks : Assumes use at not more than 20°C above ambient temperature.

Technical conditions and measures

Process categories, 2, 3, Handle substance within a closed system.

Organisational measures to prevent /limit releases, dispersion and exposure

Process categories, 2, 3, 4, 5, 8a, 8b, 9, No specific measures identified., Clean equipment and the work area every day., Clear spills immediately.Process categories, 19, Industrial use5-25%:, Avoid carrying out operation for more than 1 hour.1-5%:, Avoid carrying out operation for more than 4 hours.<1%:, No specific measures identified.Process categories, 19, Professional use5-25%:, Avoid carrying out operation for more than 15 minutes.1-5%:, Avoid carrying out operation for more than 1 hour.<1%:, Avoid carrying out operation for more than 4 hours.

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

Use suitable eye protection and gloves., Wear suitable gloves tested to EN374., 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.Process category, 195-25%:, Wear a respirator conforming to EN140 with Type A filter or better.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Assumes a good basic standard of occupational hygiene is implemented., Ensure operatives are trained to minimise exposures.

3. Exposure estimation and reference to its source

Workers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|--|---------------------|------------------------|---|
| PROC19 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |

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| | | | | | |
|--------|------------|---|---------------------|------------------------|------|
| PROC19 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, <1%:, TRA duration factor > 4 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, < 15 min | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, Half mask | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, <1%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,69 mg/m ³ | 0,94 |

Consumers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | RCR |
|-----------------------|----------------------------|---|---------------------|------------------------|------|
| PROC19 | ECETOC TRA | Industrial use, 5-25%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, 1-5%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,35 mg/m ³ | 0,75 |
| PROC19 | ECETOC TRA | Industrial use, <1%:, TRA duration factor > 4 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, < 15 min | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 5-25%:, Half mask | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
| PROC19 | ECETOC TRA | Professional use, 1-5%:, TRA duration factor 15 min - 1 h | Inhalation exposure | 1,12 mg/m ³ | 0,62 |

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| | | | | | |
|--------|------------|---|------------------------|------------------------|------|
| PROC19 | ECETOC TRA | Professional use, <1%:, TRA duration factor 1 - 4 h | Inhalation exposure | 1,69 mg/m ³ | 0,94 |
|--------|------------|---|------------------------|------------------------|------|

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0.

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1. Short title of Exposure Scenario: ES 7., Laboratory chemicals, Industrial use, Professional use, Aqueous solution

| | |
|--------------------------------|---|
| Main User Groups | : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Sector of use | : SU9: Manufacture of fine chemicals |
| Process category | : PROC15: Use as laboratory reagent |
| Environmental release category | : ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |

2.1 Contributing scenario controlling environmental exposure for: ERC4

Product characteristics

| | |
|---|---|
| Concentration of the Substance in Mixture/Article | : Covers the percentage of the substance in the product up to 100 % (unless stated differently). |
|---|---|

Technical conditions and measures / Organizational measures

| | |
|---------|---|
| Remarks | : Aluminum, aluminum powders, aluminum oxide and soluble aluminum compounds are non-hazardous (not classified for the environment). Aluminum (Al) is the most commonly occurring metallic element, comprising eight percent of the earth's crust and is therefore found in great abundance in both the terrestrial and sediment environments. Concentrations of 3-8% (30,000-80,000 ppm) are not uncommon. The relative contributions of anthropogenic aluminum to the existing natural pools of aluminum in soils and sediments is very small, and therefore, not relevant either in terms of added amounts or in terms of toxicity. |
|---------|---|

2.2 Contributing scenario controlling worker exposure for: PROC15, PC21

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Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : Aqueous solution
 Vapour pressure : < 0,1 hPa

Amount used

Remarks : Varies between ml and m³

Frequency and duration of use

Remarks : Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting workers exposure

Remarks : Assumes use at not more than 20°C above ambient temperature., Assumes a good basic standard of occupational hygiene is implemented., Ensure operatives are trained to minimise exposures.

Organisational measures to prevent /limit releases, dispersion and exposure

Process categories, 15, No specific measures identified. Clear spills immediately., Clean equipment and the work area every day.

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

Use suitable eye protection and gloves., Wear suitable gloves tested to EN374., 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.

3. Exposure estimation and reference to its source

Workers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | Risk characterisation ratio (PEC/PNEC): |
|-----------------------|----------------------------|----------------------------------|------------|-------------------|---|
| | ECETOC TRA | No specific measures identified. | | | < 1 |

Consumers

| Contributing Scenario | Exposure Assessment Method | Specific conditions | Value type | Level of Exposure | RCR |
|-----------------------|----------------------------|----------------------|------------|-------------------|-----|
| | ECETOC TRA | No specific measures | | | < 1 |

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| | | | | | |
|--|--|-------------|--|--|--|
| | | identified. | | | |
|--|--|-------------|--|--|--|

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Worker exposure for this scenario has been assessed using ECETOC TRA V2.0.