SAFETY DATA SHEET

KEMIRA PAX-18

Ref. 2.0/REG_EU/EN

Revision Date: 15.01.2014 Previous date: 20.03.2013 Print Date:04.07.2014

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

1.1 Product identifier

Commercial Product Name
KEMIRA PAX-18

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

Use of the Substance/Mixture

Water treatment chemical.
Hydrophobation of paper and board.
ES 2., Industrial use, Formulation and distribution
ES 3., Industrial use, Use of substance in synthesis as a process chemical and as an intermediate.

ES 4., Industrial use, Professional use, Spraying formulations.
ES 5., Industrial use, Professional use, Non-spraying formulations.
ES 6., Industrial use, Professional use, Water treatment chemical, Products such as pH-regulators, flocculants, precipitants, neutralization agents
ES 7., Industrial use, Professional use, Laboratory chemicals

Recommended restrictions on use

There are no uses advised against.

1.3 Details of the supplier of the safety data sheet

Kemira Water Solutions, Inc.
1000 Parkwood Circle, Suite 500
30339 Atlanta USA
Telephone+18635335990, Telefax. +18635337077
ProductSafety.US.Lakeland@kemira.com

HEAD OFFICE
Kemira Oyj
P.O. Box 330
00101 HELSINKI
FINLAND
Telephone +358108611 Telefax +358108621124

1.4 Emergency telephone number

1-800-424-9300/1-703-527-3887 (CHEMTREC), 1-613-996-6666 (CANUTEC), For Product Information 1-800-347-1542

Carechem 24 International: +44 (0) 1235 239 670

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)

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:

1327-41-9 Polyaluminium chloride

2.3 Other hazards

Advice; Heating above the decomposition temperature will release toxic gases.
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: Water solution containing polyaluminium chloride.

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
1327-41-9 215-477-2 01-2119531563-43	Polyaluminium chloride	30 - 40 %	Met. Corr. Category 1,H290 Eye Dam. Category 1,H318	Xi ,R41

Further information

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
Remove to fresh air.

Skin contact
Rinse with water. If skin irritation persists, 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. Seek medical advice.

Ingestion
Rinse mouth with water. Drink 1 or 2 glasses of water. Do NOT induce vomiting. Obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : corrosive effects, May cause irreversible eye damage.

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Treatment : Rinse with plenty of water.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Extinguishing media : The product itself does not burn.
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

Heating above the decomposition temperature can cause formation of hydrogen chloride. Exposure to decomposition products may be a hazard to health.

5.3 Special protective actions for fire-fighters

In the case of respirable dust and/or fumes, use self-contained breathing apparatus and dust impervious protective suit.

5.4 Specific methods

If possible remove containers / tanks from the dangerous area. Cool containers / tanks with water spray.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For personal protection see section 8.

6.2 Environmental precautions

Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Cover the drains. Must be disposed of in accordance with local and national regulations. Local authorities should be advised if significant spillages cannot be contained.

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

The work place and work methods shall be organized in such a way that direct contact with the product is prevented or minimized. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. For personal protection see section 8. 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), fiberglass-reinforced polyester, epoxy-coated concrete, titanium, acidproof or rubber-coated steel., polyester with fibreglass reinforcement, rubber-coated steel, titanium

Materials to avoid:

chlorites, hypochlorites, sulphites, galvanized surfaces, Iron, Strong bases

Storage stability:

Storage period 8 Months

7.3 Specific end use(s)

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure Limit Values

8.1.1 Limit values in other countries

Finland:
Polyaluminium chloride

TWA = 2 mg/m³, Calculated as Al

Sweden:

Polyaluminium chloride
NGV = 1 mg/m³, total fraction, Calculated as Al

Germany:

Polyaluminium chloride
MAK = 4 mg/m³, inhalable fraction, Calculated as Al
MAK = 1,5 mg/m³, respirable fraction, Calculated as Al
Biological occupational exposure limits = 0,2 mg/m³, Calculated as Al

Belgium:

Polyaluminium chloride
TWA = 2 mg/m³, Calculated as Al

Switzerland:

Polyaluminium chloride
TWA = 2 mg/m³

Denmark:

Polyaluminium chloride
TWA = 1 mg/m³, Calculated as Al

Estonia:

Polyaluminium chloride
TWA = 2 mg/m³

Spain:

Polyaluminium chloride
VLA-ED = 2 mg/m³, Calculated as Al

France:

Polyaluminium chloride
VME = 2 mg/m³, Calculated as Al

Great Britain:

Polyaluminium chloride
TWA = 2 mg/m³, Calculated as Al

Greece:

Polyaluminium chloride
TWA = 2 mg/m³, Calculated as Al

Ireland:

Polyaluminium chloride
TWA = 2 mg/m³, : Administrative

Lithuania:

Polyaluminium chloride

TWA = 1 mg/m³

Netherlands:

Polyaluminium chloride
TWA = 2 mg/m³

Norway:

Polyaluminium chloride
TWA = 2 mg/m³, Calculated as Al

Portugal:

Polyaluminium chloride
TWA = 2 mg/m³, Calculated as Al

DNEL

Polyaluminium chloride	:	End Use: Workers Exposure routes: oral Potential health effects: Long-term exposure - systemic effects Value: 0,5 mg/kg bw/day Calculated as Al
		End Use: Workers Exposure routes: Inhalation Potential health effects: Long-term exposure - systemic effects Value: 1,8 mg/m³ Calculated as Al
		End Use: Consumers Exposure routes: oral Potential health effects: Long-term exposure - systemic effects Value: 0,3 mg/kg bw/day Calculated as Al
		End Use: Consumers Exposure routes: Inhalation Potential health effects: Long-term exposure - systemic effects Value: 1,1 mg/m³ Calculated as Al

PNEC

Polyaluminium chloride	:	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.

Fresh water sediment
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.

Marine sediment
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

Avoid contact with skin and eyes.
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

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.
Glove material: PVC and neoprene gloves
Protective gloves complying with EN 374.
Break through time: > 480 min

Eye protection
Tightly fitting safety goggles. Eye wash bottle with pure water .

Skin and body protection
Long sleeved clothing Wear protective clothing if necessary.
Use rubber boots.

Respiratory protection
Respiratory protection is not required under normal handling conditions. If significant amounts of vapour, mist or aerosol are present use respiratory protection. (filter P2)

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General Information (appearance, odour)

Physical state	liquid, Aqueous solution
Colour	light yellow, clear
Odour	not significant

Important health safety and environmental information

pH	ca. 1,0
Crystallisation point/range	-10 °C
Boiling point/boiling range	105 - 115 °C
Flash point	not applicable, inorganic compound In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.
Flammability (solid, gas)	The product is not flammable.
Explosive properties:	
Lower explosion limit	not applicable
Upper explosion limit	not applicable
Density	1,34 - 1,40 g/cm³
Solubility(ies):	
Water solubility	(20 °C)

Partition coefficient: n-octanol/water	completely soluble not applicable, inorganic compound, In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.
Thermal decomposition	> 200 °C
Viscosity:	
Viscosity, dynamic	30 - 40 mPa.s (23 °C)
Oxidising	Not oxidizing

9.2 Other data

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Corrosive to metals.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : Bases cause exothermic reactions.

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

10.4 Conditions to avoid

Conditions to avoid : Avoid freezing.

10.5 Incompatible materials

Materials to avoid : chlorites
hypochlorites
sulphites
galvanized surfaces
Iron
Strong bases

10.6 Hazardous decomposition products

Hazardous decomposition products : Small amounts of hydrogen chloride may be released at temperatures above the boiling point.

Thermal decomposition : >200 °C

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Low order of acute toxicity.

Polyaluminium chloride:
LD50/Oral/rat: > 2.000 mg/kg
LD50/Oral/: > 487 mg/kg
Calculated as Al

LC50/Inhalation/rat: > 5,6 mg/l
LC50/Inhalation/rat: > 1,4 mg/l
Calculated as Al

LD50/Dermal: > 2.000 mg/kg
Remarks: Read-across (Analogy), CAS-No., 39290-78-3

LD50/Dermal: > 550 mg/kg
Remarks: Calculated as Al

Irritation and corrosion

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

Eyes:
May cause irreversible eye damage.

Respiratory system:
Inhalation of mist may cause irritation of the respiratory system.

Mucous membranes:
May cause irritation of the mucous membranes.

Polyaluminium chloride:

Skin: rabbit/OECD Test Guideline 404: No skin irritation
Remarks: (45% solution)

Eyes: rabbit/OECD Test Guideline 405: Eye irritation
Remarks: (45% solution)

rabbit/OECD Test Guideline 405:
Causes severe irritation to eyes in animal experiments.

May cause irreversible eye damage.

Sensitisation

Not sensitizing.

Polyaluminium chloride**:**
Not sensitizing.

Long term toxicity

Polyaluminium chloride:
Repeated dose toxicity:
Oral/rat:
NOAEL: 1.000 mg/kg
Remarks: Systemic toxicity bw/day

NOAEL: 90 mg/kg
Remarks: bw/day Calculated as Al

Oral/rat/OECD Test Guideline 422:
NOAEL: 200 mg/kg
Remarks: bw/day Local effects

NOAEL: 18 mg/kg
Remarks: bw/day Calculated as Al

Inhalation/rat:
NOAEL: = 0,0153 mg/l
Remarks: Read-across (Analogy) CAS-No. 12042-91-0

Inhalation:

NOAEL: = 0,0047 mg/l
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

In vitro gene mutation study in mammalian cells/Lymphoma/OECD Test Guideline 476:
Result: negative
Metabolic activation: with and without

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:
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

SECTION 12: ECOLOGICAL INFORMATION

12.1 Ecotoxicity effects

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 (Al3+) 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.

Polyaluminium chloride:
LC50/96 h/Danio rerio/OECD Test Guideline 203: > 1.000 mg/l
LC50: > 243 mg/l
Calculated as Al

NOEC/Danio rerio/OECD Test Guideline 203: > 1.000 mg/l
LC50: > 0,156 mg/l
Calculated as Al Maximum soluble concentration under the test conditions.

EC50/Daphnia magna (Water flea)/semi-static test/OECD Test Guideline 202: 98 mg/l
EC50: 24 mg/l
Calculated as Al

EC50/72 h/Pseudokirchneriella subcapitata (green algae)/static test/OECD Test Guideline 201: 15,6 mg/l
EC50: 3,8 mg/l
Calculated as Al

NOEC/72 h/Pseudokirchneriella subcapitata (green algae)/static test/OECD Test Guideline 201: 1,1 mg/l
NOEC: 0,27 mg/l
Calculated as Al

Toxicity to other organisms

no data available

12.2 Persistence and degradability

Biological degradability:

The methods for determining biodegradability are not applicable to inorganic substances.

Biological degradability:
Polyaluminium chloride:

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

Chemical degradation:
Polyaluminium chloride:

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

12.3 Bioaccumulative potential

The product is not expected to bioaccumulate.
Partition coefficient: n-octanol/water: not applicable, inorganic compound, In accordance with column 2 of REACH Annex VII, the study does not need to be conducted.

Polyaluminium chloride:
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 nor toxic (PBT).

This mixture contains no substance considered to be very persistent nor 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.Dilute residues with water and

Contaminated packaging	then neutralize with lime or limestone powder.Must be disposed of in accordance with local and national regulations. Thoroughly cleaned packaging material may be recycled. Packages that cannot be cleaned must be disposed of the same way as the unused product.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number	3264
Land transport	
ADR /RID:	
Description of the goods:	
14.2UN proper shipping name	Corrosive liquid, acidic, inorganic n.o.s. (Polyaluminium chloride)
14.3 Class	8
14.4 Packaging group:	III
Risk code	80
ADR/RID-Labels:	8
Sea transport	
IMDG:	
Description of the goods:	
14.2UN proper shipping name	UN3264, CORROSIVE LIQUID, ACIDIC, INORGANIC N.O.S. (POLYALUMINIUM CHLORIDE)
14.3 Class:	8
14.4 Packaging group:	III
IMDG-Labels:	8
14.5 Environmentally Hazardous:	Not a Marine Pollutant
Air transport	
ICAO/IATA:	
Description of the goods	
14.2UN proper shipping name	UN3264, Corrosive liquid, acidic, inorganic n.o.s. (Polyaluminium chloride)
14.3 Class:	8
14.4 Packaging group:	III
ICAO-Labels:	8
14.6 Special precautions for user	

SECTION 15: REGULATORY INFORMATION

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

Notification status

:

: All components of this product are included in the United States TSCA Chemical Inventory or are not required to be listed on the United States TSCA Chemical Inventory.
: All components of this product are included in the Canada Domestic Substance List (DSL) or are not required to be listed on the Canada Domestic Substance List (DSL).
: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on the Australian Inventory of Chemical Substances (AICS).
: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.
: All components of this product are included in the Korean (ECL) inventory or are not required to be listed on the Korean (ECL) inventory.
: All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine (PICCS) inventory.
: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese (ENCS) inventory.
: All components of this product are included in the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on EINECS.
:

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for the main component.

SECTION 16: OTHER INFORMATION

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

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

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
3. 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;

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 tabletting, 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).

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.

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 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.orWear 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 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:
PROC19	ECETOC TRA	Industrial use, 5-25%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,35 mg/m³	0,75
PROC19	ECETOC TRA	Industrial use, 1-5%:, TRA duration factor 1 - 4 h	Inhalation exposure	1,35 mg/m³	0,75
PROC19	ECETOC TRA	Industrial use, <1%:, TRA duration factor > 4 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, 5-25%:, < 15 min	Inhalation exposure	1,69 mg/m³	0,94

PROC19	ECETOC TRA	Professional use, 5-25%:, Half mask	Inhalation exposure	1,69 mg/m³	0,94
PROC19	ECETOC TRA	Professional use, 1-5%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, <1%:, TRA duration factor 1 - 4 h	Inhalation exposure	1,69 mg/m³	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.

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

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 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.

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:
	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.

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

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

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.
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 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:
PROC7	ECETOC TRA	Industrial use, 5-25%:, Half mask, 90 %, (with LEV)	Inhalation exposure	0,67 mg/m³	0,37
PROC7	ECETOC TRA	Industrial use, 5-25%:, TRA duration factor 15 min - 1 h, Half mask	Inhalation exposure	1,35 mg/m³	0,75
PROC7	ECETOC TRA	Industrial use, 5-25%:, TRA duration factor 15 min - 1 h, 90 %, (with LEV)	Inhalation exposure	1,35 mg/m³	0,75
PROC7	ECETOC TRA	Industrial use, 1-5%:, TRA duration factor 1 - 4 h, Half mask	Inhalation exposure	1,35 mg/m³	0,75
PROC7	ECETOC TRA	Industrial use, <1%:, < 15 min	Inhalation exposure	1,12 mg/m³	0,62
PROC11	ECETOC TRA	Professional use, 5-25%:,	Inhalation exposure	1,35 mg/m³	0,75

		Half mask, 80 %, (with LEV)			
PROC11	ECETOC TRA	Professional use, 5-25%:, < 15 min, 80 %, (with LEV)	Inhalation exposure	1,35 mg/m³	0,75
PROC11	ECETOC TRA	Professional use, 1-5%:, TRA duration factor 15 min - 1 h, 80 %, (with LEV)	Inhalation exposure	0,90 mg/m³	0,50
PROC11	ECETOC TRA	Professional use, <1%:, < 15 min	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Industrial use, 5-25%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,35 mg/m³	0,75
PROC19	ECETOC TRA	Industrial use, 1-5%:, TRA duration factor 1 - 4 h	Inhalation exposure	1,35 mg/m³	0,75
PROC19	ECETOC TRA	Industrial use, <1%:, TRA duration factor > 4 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, 5-25%:, < 15 min	Inhalation exposure	1,69 mg/m³	0,94
PROC19	ECETOC TRA	Professional use, 5-25%:, Half mask	Inhalation exposure	1,69 mg/m³	0,94
PROC19	ECETOC TRA	Professional use, 1-5%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, <1%:, TRA duration factor 1 - 4 h	Inhalation exposure	1,69 mg/m³	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.

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 tabletting, 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

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.

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 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.

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.

<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:
PROC10	ECETOC TRA	Industrial use, 5-25%:, 80 %, (with LEV)	Inhalation exposure	1,35 mg/m³	0,75
PROC10	ECETOC TRA	Industrial use, 5-25%:, Half mask	Inhalation exposure	0,67 mg/m³	0,37
PROC10	ECETOC TRA	Industrial use, 5-25%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,35 mg/m³	0,75
PROC10	ECETOC TRA	Industrial use, 1-5%:, TRA duration	Inhalation exposure	1,35 mg/m³	0,75

		factor 1 - 4 h			
PROC10	ECETOC TRA	Industrial use, <1%:	Inhalation exposure	1,12 mg/m³	0,62
PROC10	ECETOC TRA	Professional use, 5-25%:, TRA duration factor 15 min - 1 h, 80 %, (with LEV)	Inhalation exposure	0,67 mg/m³	0,37
PROC10	ECETOC TRA	Professional use, 5-25%:, TRA duration factor 1 - 4 h, Half mask	Inhalation exposure	1,01 mg/m³	0,56
PROC10	ECETOC TRA	Professional use, 1-5%:, TRA duration factor 15 min - 1 h	Inhalation exposure	0,90 mg/m³	0,50
PROC10	ECETOC TRA	Professional use, 1-5%:, 80 %, (with LEV)	Inhalation exposure	1,12 mg/m³	0,62
PROC10		Professional use, 1-5%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,12 mg/m³	0,62
PROC10		Professional use, <1%:, 80 %, (with LEV)	Inhalation exposure	0,56 mg/m³	0,31
PROC19	ECETOC TRA	Industrial use, 5-25%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,35 mg/m³	0,75
PROC19	ECETOC TRA	Industrial use, 1-5%:, TRA duration factor 1 - 4 h	Inhalation exposure	1,35 mg/m³	0,75
PROC19	ECETOC TRA	Industrial use, <1%:, TRA duration factor > 4 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, 5-25%:,	Inhalation exposure	1,69 mg/m³	0,94

		< 15 min			
PROC19	ECETOC TRA	Professional use, 5-25%:, Half mask	Inhalation exposure	1,69 mg/m³	0,94
PROC19	ECETOC TRA	Professional use, 1-5%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, <1%:, TRA duration factor 1 - 4 h	Inhalation exposure	1,69 mg/m³	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.

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

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 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.

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:
PROC19	ECETOC TRA	Industrial use, 5-25%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,35 mg/m³	0,75
PROC19	ECETOC TRA	Industrial use,	Inhalation	1,35 mg/m³	0,75

		1-5%:, TRA duration factor 1 - 4 h	exposure		
PROC19	ECETOC TRA	Industrial use, <1%:, TRA duration factor > 4 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, 5-25%:, < 15 min	Inhalation exposure	1,69 mg/m³	0,94
PROC19	ECETOC TRA	Professional use, 5-25%:, Half mask	Inhalation exposure	1,69 mg/m³	0,94
PROC19	ECETOC TRA	Professional use, 1-5%:, TRA duration factor 15 min - 1 h	Inhalation exposure	1,12 mg/m³	0,62
PROC19	ECETOC TRA	Professional use, <1%:, TRA duration factor 1 - 4 h	Inhalation exposure	1,69 mg/m³	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.

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

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.

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:
	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.