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

1.1 Product identifier

Trade name : AN 33,5 N, AN 34,0 N, AN 34,4 N

CAS-No. : 6484-52-2

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

Use of the Substance/Mixture : Fertilizers

1.3 Details of the supplier of the safety data sheet

Supplier : Borealis L.A.T GmbH
St.-Peter-Strasse 25, 4021 Linz, Austria
Telephone: +43 732 6915-0

E-mail address : sds@borealisgroup.com

1.4 Emergency telephone number

+44 (0) 1235 239 670 (24h)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Oxidizing solids, Category 3	H272: May intensify fire; oxidizer.
Eye irritation, Category 2	H319: Causes serious eye irritation.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Warning

Hazard statements : H272 May intensify fire; oxidizer.
H319 Causes serious eye irritation.

Precautionary statements : **Prevention:**

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220	Keep/Store away from combustible materials.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P264	Wash hands thoroughly after handling.

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.
P370 + P378	In case of fire: Use water to extinguish.

Hazardous components which must be listed on the label:
Ammonium nitrate

2.3 Other hazards

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

SECTION 3: Composition/information on ingredients

Ammonium nitrate: fertilizer grade This product complies with standard NF U 42-001-1 and Regulation (EU) 2003/2003.

3.2 Mixtures

Hazardous components

Chemical name	CAS-No. EC-No. Registration number	Classification (REGULATION (EC) No 1272/2008)	Concentration (% w/w)
Ammonium nitrate	6484-52-2 229-347-8 01-2119490981-27	Ox. Sol. 3; H272 Eye Irrit. 2; H319	>= 94

Remarks : REACH Registration Numbers: www.borealisgroup.com , Company - REACH - Registered substances

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled : Remove to fresh air.
If not breathing, give artificial respiration.
If breathing is difficult, give oxygen.
Seek medical advice.
No mouth-to-mouth respiration.

In case of skin contact : Wash off with soap and plenty of water.
Remove contaminated clothing and shoes.
Call a physician if irritation develops or persists.

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 5 minutes.
If easy to do, remove contact lens, if worn.
Get medical attention if irritation develops and persists.

If swallowed : Obtain medical attention.
Clean mouth with water and drink afterwards plenty of water.
Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms : Eye contact:
Irritation

Inhalation of dust may provoke the following symptoms:
Respiratory irritation
Cough

Inhalation of decomposition fumes may provoke the following symptoms:
Risk of delayed pulmonary oedema.

Gastrointestinal disturbance
The absorption of this product into the body may lead to the formation of methaemoglobine that, in sufficient concentration, causes cyanosis.

Risks : Causes serious eye irritation.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Treat symptomatically.
There is no specific antidote available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : High volume water jet

Unsuitable extinguishing media : Foam
Sand
Dry powder
Halons
Carbon dioxide (CO2)

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting : Hazardous decomposition products formed under fire conditions.
Toxic vapours are evolved.

Nitrogen oxides (NOx)
Ammonia

Potential explosion hazard when heated under strong confinement (e.g. tubes and drains) especially if contaminated with incompatible material.
See chapter 10.

5.3 Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.
Complete suit protecting against chemicals

Further information : Prevent fire extinguishing water from contaminating surface water or the ground water system.
Contact the proper local authorities.

Avoid inhalation of decomposition fumes.
Ensure doors and windows are opened.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment.
Avoid dust formation.
Eliminate all ignition sources if safe to do so.
Sweep up to prevent slipping hazard.

6.2 Environmental precautions

Do not flush into surface water or sanitary sewer system.
If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Sweep up or vacuum up spillage and collect in suitable container for disposal.
Do not mix with sawdust, combustible or organic material.
Keep the container open.
After cleaning, flush away traces with water.

6.4 Reference to other sections

For personal protection see section 8.
For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Avoid creating dust. Ensure adequate ventilation. Keep away from incompatible materials. Keep away from food, drink and animal feedingstuffs. Use only clean equipment.
Advice on protection against fire and explosion	:	Keep away from heat and sources of ignition. Keep away from combustible material.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Regular cleaning of equipment, work area and clothing. Wash hands before breaks and immediately after handling the product. When using do not eat, drink or smoke.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep in a dry, cool and well-ventilated place. Store in a place accessible by authorized persons only. Restrict stack size (according to local regulations) and keep at least 1m distance around the stacks of bagged products. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Suitable materials for containers: Plastics Stainless steel Aluminium Unsuitable materials for containers: Copper Zinc

Further information on storage conditions	:	Protect from sunlight. Do not expose to temperatures exceeding 32 °C. Avoid unprotected outdoor storage. Protect from moisture.
Advice on common storage	:	Do not store near combustible materials. Keep away from incompatible materials. See chapter 10. On farm, ensure that the fertilizer is not stored near hay, straw, grain, diesel oil, etc.

7.3 Specific end use(s)

Specific use(s)	:	Consult the technical guidelines for the use of this substance/mixture.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

For national exposure limit (OEL) values, check country specific safety data sheets.

DNEL:

Ammonium nitrate	:	**End Use: Workers** Exposure routes: Skin contact Potential health effects: Long-term, Systemic Value: 5,12 mg/kg **End Use: Workers** Exposure routes: Inhalation Potential health effects: Long-term, Systemic Value: 36 mg/m3 **End Use: Consumers** Exposure routes: Skin contact Potential health effects: Long-term, Systemic Value: 2,56 mg/kg **End Use: Consumers** Exposure routes: Inhalation Potential health effects: Long-term, Systemic Value: 8,9 mg/m3 **End Use: Consumers** Exposure routes: Ingestion Potential health effects: Long-term, Systemic Value: 2,56 mg/kg

PNEC:

Ammonium nitrate	:	Sewage treatment plant Value: 18 mg/l

8.2 Exposure controls

Engineering measures

Provide adequate ventilation.
Before working with fire and hot materials on containers and apparatus remains of products must be deleted through efficient cleaning with water.

Personal protective equipment

Eye protection	:	Safety goggles or face-shield. (EN 166)
Hand protection		
Remarks	:	For prolonged or repeated contact use protective gloves. Rubber or plastic gloves Leather gloves The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.
Skin and body protection	:	Wear suitable protective clothing.
Respiratory protection	:	Respirator must be worn if exposed to dust. Respiratory protection complying with EN 143 / EN 149.
Filter type	:	P1 filter
Protective measures	:	Ensure that eye flushing systems and safety showers are located close to the working place.

Environmental exposure controls

General advice	:	Do not flush into surface water or sanitary sewer system. If the product contaminates rivers and lakes or drains inform respective authorities.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	granules, prills
Colour	:	white, beige
Odour	:	odourless

Odour Threshold	:	Not applicable
pH	:	> 4,5, 10 %
Melting point	:	169 °C (1.013 hPa)
Boiling point	:	Decomposition: Decomposes below the boiling point.
Flash point	:	Not applicable, (inorganic)
Evaporation rate	:	negligible
Flammability (solid, gas)	:	The product is not flammable.
Upper explosion limit	:	Not applicable
Lower explosion limit	:	Not applicable
Vapour pressure	:	negligible
Relative vapour density	:	Not applicable
Relative density	:	1,72 (20 °C)
Bulk density	:	890 kg/m³
Solubility(ies) Water solubility	:	1.870 g/l very soluble (20 °C)
Auto-ignition temperature	:	No data available
Decomposition temperature	:	> 210 °C
Viscosity Viscosity, dynamic	:	Not applicable (solid)
Explosive properties	:	Not explosive UN Series 1 and 2 Total combustible materials in the form of carbon: equal to or less than 0,2%. Potential explosion hazard when heated under strong confinement (e.g. tubes and drains) especially if contaminated with incompatible material.
Oxidizing properties	:	May intensify fire; oxidizer.

9.2 Other information

Molecular weight : 80,04 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity

No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

Stable under recommended storage conditions.
Repeated heating and cooling above and below 32°C the product becomes porous through the change of crystalline structure, coupled with increased dust building and increased volume of prills. This can lead to a breaking of bags and to product withdrawal.

10.3 Possibility of hazardous reactions

Hazardous reactions : Contact with strong bases liberates ammonia.
Contact with strong acids liberates nitrous gases.
Decomposes on heating.

10.4 Conditions to avoid

Conditions to avoid : Temperature > 170 °C
Risk of explosion if heated under confinement.
Keep away from incompatible materials.
Exposure to air or moisture over prolonged periods.

10.5 Incompatible materials

Materials to avoid : Organic materials
Reducing agents
Combustible material
Strong acids and strong bases
Powdered metals
Copper
Copper alloys
Chlorates
Chromates
Nitrites
sulphur
permanganates

10.6 Hazardous decomposition products

Nitrogen oxides (NOx), Ammonia

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Not classified based on available information.

Components:

Ammonium nitrate:

Acute oral toxicity	:	LD50 (Rat): 2.950 mg/kg Method: OECD Test Guideline 401
Acute inhalation toxicity	:	LC50: > 88,8 mg/l Method: No information available.
Acute dermal toxicity	:	LD50: > 5.000 mg/kg Method: OECD Test Guideline 402

Skin corrosion/irritation

Not classified based on available information.

Components:

Ammonium nitrate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Components:

Ammonium nitrate:
Species: Rabbit
Method: OECD Test Guideline 405
Result: Irritating to eyes.

Respiratory or skin sensitisation

Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.

Components:

Ammonium nitrate:
Species: Mouse
Method: OECD Test Guideline 429
Result: Does not cause skin sensitisation.
Test substance: Calcium ammonium nitrate

Read-across (Analogy)

Germ cell mutagenicity

Not classified based on available information.

Components:

Ammonium nitrate:

Genotoxicity in vitro : Test Type: Ames test
Method: OECD Test Guideline 471
Result: negative
Test substance: Ammonium calcium nitrate

: Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative
Test substance: Ammonium calcium nitrate

: Test Type: In vitro gene mutation study in mammalian cells
Method: OECD Test Guideline 476
Result: negative
Test substance: Potassium nitrate

Carcinogenicity

Not classified based on available information.

Components:

Ammonium nitrate:

Remarks: No significant adverse effects were reported

Reproductive toxicity

Not classified based on available information.

Components:

Ammonium nitrate:

Effects on fertility : Species: Rat
NOAEL: > 1.500 mg/kg,
Method: OECD Test Guideline 422
Test substance: Potassium nitrate

STOT - single exposure

Not classified based on available information.

Components:

Ammonium nitrate:

Assessment: Based on available data, the classification criteria are not met.

STOT - repeated exposure

Not classified based on available information.

Components:

Ammonium nitrate:
Species: Rat
NOAEL: 256 mg/kg
Application Route: Oral
Exposure time: 364 d
Method: OECD Test Guideline 453
Test substance: Ammonium sulphate

Species: Rat
NOAEL: 0,185 mg/l
Application Route: Inhalation
Exposure time: 14 d
Method: OECD Test Guideline 412
Test substance: Ammonium nitrate

Aspiration toxicity

Not classified based on available information.

Components:

Ammonium nitrate:
No data available

SECTION 12: Ecological information

12.1 Toxicity

Components:

Ammonium nitrate:

Toxicity to fish	:	LC50 (Cyprinus carpio (Carp)): 447 mg/l Exposure time: 48 h Test Type: Short term
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 490 mg/l Exposure time: 48 h Test Type: Short term Test substance: Potassium nitrate Remarks: Fresh water
Toxicity to algae	:	EC50 : > 1.700 mg/l Exposure time: 10 d Test substance: Potassium nitrate Remarks: Marine water

Toxicity to bacteria	:	EC50 : > 1.000 mg/l Exposure time: 180 min Test Type: Respiration inhibition of activated sludge Test substance: Sodium nitrate Method: OECD Test Guideline 209
Toxicity to fish (Chronic toxicity)	:	Remarks: study scientifically unjustified
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	EC50: 555 mg/l Exposure time: 7 d Species: Bullia digitalis (prosobranch gastropod)

12.2 Persistence and degradability

Components:

Ammonium nitrate:

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

12.3 Bioaccumulative potential

Components:

Ammonium nitrate:

Bioaccumulation	:	Remarks: Bioaccumulation is unlikely.

12.4 Mobility in soil

Components:

Ammonium nitrate:

Mobility	:	Medium: Water Remarks: completely soluble
	:	Medium: Soil Remarks: (NO3-), Not expected to adsorb on soil.
	:	Medium: Soil Remarks: (NH4+), After release, adsorbs onto soil.

12.5 Results of PBT and vPvB assessment

Product:

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

12.6 Other adverse effects

Product:

Additional ecological information : Remarks: Do not allow product to reach ground water, water bodies or sewage system.
Heavy spillage may cause adverse environmental impact such as eutrophication in confined surface waters.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product : Can be landfilled or incinerated, when in compliance with local regulations.
Do not allow product to reach ground water, water bodies or sewage system.
Do not dispose of together with household waste.

European waste code:
06 10 02* (wastes containing dangerous substances)

SECTION 14: Transport information

14.1 UN number

ADR : UN 2067

RID : UN 2067

IMDG : UN 2067

14.2 UN proper shipping name

ADR : AMMONIUM NITRATE BASED FERTILIZER

RID : AMMONIUM NITRATE BASED FERTILIZER

IMDG : AMMONIUM NITRATE BASED FERTILIZER

14.3 Transport hazard class(es)

ADR : 5.1

RID : 5.1

IMDG : 5.1

Subsidiary hazard class :

14.4 Packing group

ADR

Packing group	:	III
Hazard Identification Number	:	50
Labels	:	5.1
Tunnel restriction code	:	(E)

RID

Packing group	:	III
Classification Code	:	O2
Hazard Identification Number	:	50
Labels	:	5.1

IMDG

Packing group	:	III
Labels	:	5.1
EmS Code	:	F-H, S-Q

14.5 Environmental hazards

ADR

Environmentally hazardous : no

RID

Environmentally hazardous : no

IMDG

Marine pollutant : no

14.6 Special precautions for user

Remarks : No specific instructions needed.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Remarks : No data is available on the product itself.

SECTION 15: Regulatory information

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

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII) : Ammonium nitrate
Restricted to professional users.

See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction

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

Category	Quantity 1	Quantity 2

2		Ammonium nitrate: fertilizer grade	1.250 t	5.000 t

Other regulations : Regulation (EU) No 98/2013 of the European Parliament and of the Council of 15 January 2013 on the marketing and use of explosives precursors:
Annex II

Regulation (EC) No 2003/2003 relating to fertilizers

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements

H272 : May intensify fire; oxidizer.
H319 : Causes serious eye irritation.

Full text of other abbreviations

Eye Irrit. : Eye irritation
Ox. Sol. : Oxidizing solids

Further information

Training advice : Provide adequate information, instruction and training for operators., Regular trainings of all employees which are involved in the transport of dangerous goods (according to chapter 1.3 ADR).

Other information : Issued according to Regulation (EC) No 1907/2006, Annex II, and its amendments.
Changes since the last version are highlighted in the margin.
This version replaces all previous versions.

Issuer : Borealis, Group Product Stewardship / Mikaela Eriksson.

Sources of key data used to compile the Safety Data Sheet : Chemical Safety Report, Ammonium Nitrate. FARM REACH Consortium, 2015

Disclaimer

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication; however we do not assume any liability whatsoever for the accuracy and completeness of such information.

Borealis makes no warranties which extend beyond the description contained herein. Nothing herein shall constitute any warranty of merchantability or fitness for a particular purpose.

It is the customer's responsibility to inspect and test our products in order to satisfy itself as to the suitability of the products for the customer's particular purpose. The customer is responsible for the appropriate, safe and legal use, processing and handling of our products.

No liability can be accepted in respect of the use of Borealis' products in conjunction with other materials. The information contained herein relates exclusively to our products when not used in conjunction with any third party materials.

Identified uses:

Use: Manufacture

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU3:** Industrial Manufacturing (all)
Process categories	:	**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) **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC1:** Manufacture of substances

Use: Formulation

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU 10:** Formulation
Chemical product category	:	**PC12:** Fertilizers
Process categories	:	**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) **PROC13:** Treatment of articles by dipping and pouring **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC2:** Formulation of preparations

Use: Industrial use, Use as an intermediate

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU8:** Manufacture of bulk, large scale chemicals (including petroleum products)
Chemical product category	:	**PC19:** Intermediate
Process categories	:	**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) **PROC13:** Treatment of articles by dipping and pouring **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)

Use: Professional use, Wide-dispersive uses

Main User Groups	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	:	**SU1:** Agriculture, forestry, fishery
Chemical product category	:	**PC12:** Fertilizers
Process categories	:	**PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **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
Environmental Release Categories	:	**ERC8b, ERC8e:** Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of reactive substances in open systems

Use: Consumer use, Wide-dispersive uses

Main User Groups	:	**SU 21:** Consumer uses: Private households (= general public = consumers)
Chemical product category	:	**PC12:** Fertilizers
Environmental Release Categories	:	**ERC8b, ERC8e:** Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of reactive substances in open systems

1. Short title of Exposure Scenario: Manufacture

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU3:** Industrial Manufacturing (all)
Process categories	:	**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) **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC1:** Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1: Manufacture of substances

Remarks	:	Exposure assessment and risk characterization are not required for environment.

2.2 Contributing scenario controlling worker exposure for: Manufacture, General measures

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC14, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, Transfer of substance or preparation (charging/

discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Production of preparations or articles by tabletting, compression, extrusion, pelletisation, Use as laboratory reagent

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers concentrations up to 100%.
Physical Form (at time of use)	:	Solid, low dustiness

Frequency and duration of use

Duration of the acitivity	:	< 8 h

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Ventilation rate per hour	:	1 - 3
Remarks	:	Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures

Handle substance within a closed system. Provide a good standard of general ventilation (not less than 1 to 3 air changes per hour). Wash off skin contamination immediately.

Organisational measures to prevent /limit releases, dispersion and exposure

Integrated safety management systems

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

Skin protection, Long sleeved clothing, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness (of a measure): 90 %)
Eye protection, Goggles
Respiratory protection, No (Effectiveness (of a measure): 0 %)

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Minimise number of staff exposed., Effective contaminant extraction., Minimisation of manual phases., Avoidance of contact with contaminated tools and objects., Regular cleaning of equipment, work area and clothing., Handle in accordance with good industrial hygiene and safety practice.

2.3 Contributing scenario controlling worker exposure for: Manufacture PROC1: Use in closed process, no likelihood of exposure

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures Closed system (minimal contact during routine operations)

2.4 Contributing scenario controlling worker exposure for: Manufacture PROC2: Use in closed, continuous process with occasional controlled exposure

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Use in closed, continuous process with occasional controlled exposure

2.5 Contributing scenario controlling worker exposure for: Manufacture PROC3: Use in closed batch process (synthesis or formulation)

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures Closed batch process with occational controlled exposure

2.6 Contributing scenario controlling worker exposure for: Manufacture PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.7 Contributing scenario controlling worker exposure for: Manufacture PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures No

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

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.9 Contributing scenario controlling worker exposure for: Manufacture PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.10 Contributing scenario controlling worker exposure for: Manufacture PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.11 Contributing scenario controlling worker exposure for: Manufacture PROC15: Use as laboratory reagent

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures No

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC1			Other			
Remarks:		Exposure assessment and risk characterization are not required for environment.				

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC1	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,01 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,003 mg/kg bw/day	< 0,01
		Systemic, Long term	all routes		< 0,01
PROC2	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,01 mg/m³	< 0,01
		Systemic, Long term	Dermal	0,137 mg/kg bw/day	0,027
		Systemic, Long term	all routes		0,027
PROC3	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,069 mg/kg bw/day	0,013
		Systemic, Long term	all routes		0,016
PROC4	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	0,686 mg/kg bw/day	0,134
		Systemic, Long term	all routes		0,148
PROC8a	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,282
PROC8b	ECETOC TRA	Indoor without LEV,	Inhalation	0,1 mg/m³	< 0,01

		Systemic, Long term			
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,271
PROC9	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,686 mg/kg bw/day	0,134
		Systemic, Long term	all routes		0,137
PROC14	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,343 mg/kg bw/day	0,067
		Systemic, Long term	all routes		0,07
PROC15	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,034 mg/kg bw/day	< 0,01
		Systemic, Long term	all routes		< 0,01
Remarks:		LEV = Local Exhaust Ventilation.			
		Dermal, local, long term: there is no DNEL available nor a suitable benchmark value so quantitative dermal exposure estimation is not meaningful.			
		Qualitative assessment: As personal protective equipment is worn, the risk of local effects via long-term dermal exposure is considered to be controlled.			

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Formulation

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU 10:** Formulation
Chemical product category	:	**PC12:** Fertilizers
Process categories	:	**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) **PROC13:** Treatment of articles by dipping and pouring **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC2:** Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2: Formulation of preparations

Remarks	:	Exposure assessment and risk characterization are not required for environment.

2.2 Contributing scenario controlling worker exposure for: Formulation, General measures
PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15: Use in closed, continuous process with occasional controlled exposure, Use in closed

batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact), Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Treatment of articles by dipping and pouring, Production of preparations or articles by tabletting, compression, extrusion, pelletisation, Use as laboratory reagent, PC12: Fertilizers

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers concentrations up to 100%.
Physical Form (at time of use)	:	Solid, Liquid, Dustiness: Low

Frequency and duration of use

Duration of the acitivity	:	< 8 h

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Ventilation rate per hour	:	1 - 3
Remarks	:	Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures

Handle substance within a closed system. Provide a good standard of general ventilation (not less than 1 to 3 air changes per hour). Wash off skin contamination immediately.

Organisational measures to prevent /limit releases, dispersion and exposure

Integrated safety management systems

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

Skin protection, Long sleeved clothing, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness (of a measure): 90 %)
Eye protection, Safety goggles or face-shield.
Respiratory protection, No (Effectiveness (of a measure): 0 %)

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Minimise number of staff exposed., Effective contaminant extraction., Minimisation of manual phases., Avoidance of contact with contaminated tools and objects., Regular cleaning of equipment, work area and clothing., Handle in accordance with good industrial hygiene and safety practice.

2.3 Contributing scenario controlling worker exposure for: Formulation PROC2: Use in closed, continuous process with occasional controlled exposure

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Use in closed, continuous process with occasional controlled exposure

2.4 Contributing scenario controlling worker exposure for: Formulation PROC3: Use in closed batch process (synthesis or formulation)

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures Closed batch process with occational controlled exposure

2.5 Contributing scenario controlling worker exposure for: Formulation PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.6 Contributing scenario controlling worker exposure for: Formulation PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.7 Contributing scenario controlling worker exposure for: Formulation PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures No

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

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.9 Contributing scenario controlling worker exposure for: Formulation PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.10 Contributing scenario controlling worker exposure for: Formulation PROC13: Treatment of articles by dipping and pouring

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.11 Contributing scenario controlling worker exposure for: Formulation PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.12 Contributing scenario controlling worker exposure for: Formulation PROC15: Use as laboratory reagent

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures No

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC2			Other			
Remarks:		Exposure assessment and risk characterization are not required for environment.				

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC2	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,01 mg/m³	< 0,01
		Systemic, Long term	Dermal	0,137 mg/kg bw/day	0,027
		Systemic, Long term	all routes		0,027
PROC3	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long	Dermal	0,069 mg/kg	0,013

		term		bw/day	
		Systemic, Long term	all routes		0,016
PROC4	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	0,686 mg/kg bw/day	0,134
		Systemic, Long term	all routes		0,148
PROC5	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,282
PROC8a	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,282
PROC8b	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,271
PROC9	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,686 mg/kg bw/day	0,134
		Systemic, Long term	all routes		0,137
PROC13	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,271
PROC14	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,343 mg/kg bw/day	0,067
		Systemic, Long term	all routes		0,07
PROC15	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,034 mg/kg bw/day	< 0,01
		Systemic, Long term	all routes		< 0,01
Remarks:		LEV = Local Exhaust Ventilation.			
		Dermal, local, long term: there is no DNEL available nor a suitable benchmark value so quantitative dermal exposure estimation is not meaningful.			
		Qualitative assessment: As personal protective equipment is worn, the risk of local effects via long-term dermal exposure is considered to be			

	controlled.

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Industrial use, Use as an intermediate

Main User Groups	:	**SU 3:** Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	:	**SU8:** Manufacture of bulk, large scale chemicals (including petroleum products)
Chemical product category	:	**PC19:** Intermediate
Process categories	:	**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) **PROC13:** Treatment of articles by dipping and pouring **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation **PROC15:** Use as laboratory reagent
Environmental Release Categories	:	**ERC6a:** Industrial use resulting in manufacture of another substance (use of intermediates)

2.1 Contributing scenario controlling environmental exposure for: ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Remarks	:	Exposure assessment and risk characterization are not required for environment.

2.2 Contributing scenario controlling worker exposure for: Use as an intermediate, General measures

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15: Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact), Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Treatment of articles by dipping and pouring, Production of preparations or articles by tabletting, compression, extrusion, pelletisation, Use as laboratory reagent, PC19: Intermediate

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers concentrations up to 100%.
Physical Form (at time of use)	:	Solid, Liquid, Dustiness: Low

Frequency and duration of use

Duration of the acitivity	:	< 8 h

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Ventilation rate per hour	:	1 - 3
Remarks	:	Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures

Handle substance within a closed system. Provide a good standard of general ventilation (not less than 1 to 3 air changes per hour). Wash off skin contamination immediately.

Organisational measures to prevent /limit releases, dispersion and exposure

Integrated safety management systems

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

Skin protection, Long sleeved clothing, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness (of a measure): 90 %)
Goggles
Respiratory protection, No (Effectiveness (of a measure): 0 %)

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Minimise number of staff exposed., Effective contaminant

extraction., Minimisation of manual phases., Avoidance of contact with contaminated tools and objects., Regular cleaning of equipment, work area and clothing., Handle in accordance with good industrial hygiene and safety practice.

2.3 Contributing scenario controlling worker exposure for: Use as an intermediate PROC1: Use in closed process, no likelihood of exposure

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures Closed system (minimal contact during routine operations)

2.4 Contributing scenario controlling worker exposure for: Use as an intermediate PROC2: Use in closed, continuous process with occasional controlled exposure

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Use in closed, continuous process with occasional controlled exposure

2.5 Contributing scenario controlling worker exposure for: Use as an intermediate PROC3: Use in closed batch process (synthesis or formulation)

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures Closed batch process with occational controlled exposure

2.6 Contributing scenario controlling worker exposure for: Use as an intermediate PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.7 Contributing scenario controlling worker exposure for: Use as an intermediate PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.8 Contributing scenario controlling worker exposure for: Use as an intermediate PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures No

2.9 Contributing scenario controlling worker exposure for: Use as an intermediate PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.10 Contributing scenario controlling worker exposure for: Use as an intermediate PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.11 Contributing scenario controlling worker exposure for: Use as an intermediate PROC13: Treatment of articles by dipping and pouring

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.12 Contributing scenario controlling worker exposure for: Use as an intermediate PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.13 Contributing scenario controlling worker exposure for: Use as an intermediate PROC15: Use as laboratory reagent

Human factors not influenced by risk management

Dermal exposure : One hand face only (240 cm2)

Technical conditions and measures

Containment measures No

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR

ERC6a			Other			
Remarks:		Exposure assessment and risk characterization are not required for environment.				

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC1	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,01 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,003 mg/kg bw/day	< 0,01
		Systemic, Long term	all routes		< 0,01
PROC2	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,01 mg/m³	< 0,01
		Systemic, Long term	Dermal	0,137 mg/kg bw/day	0,027
		Systemic, Long term	all routes		0,027
PROC3	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,069 mg/kg bw/day	0,013
		Systemic, Long term	all routes		0,016
PROC4	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	0,686 mg/kg bw/day	0,134
		Systemic, Long term	all routes		0,148
PROC5	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,282
PROC8a	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,282
PROC8b	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,271
PROC9	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,686 mg/kg bw/day	0,134
		Systemic, Long term	all routes		0,137

PROC13	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,271
PROC14	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,343 mg/kg bw/day	0,067
		Systemic, Long term	all routes		0,07
PROC15	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,1 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,034 mg/kg bw/day	< 0,01
		Systemic, Long term	all routes		< 0,01
Remarks:		LEV = Local Exhaust Ventilation.			
		Dermal, local, long term: there is no DNEL available nor a suitable benchmark value so quantitative dermal exposure estimation is not meaningful.			
		Qualitative assessment: As personal protective equipment is worn, the risk of local effects via long-term dermal exposure is considered to be controlled.			

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Professional use, Wide-dispersive uses

Main User Groups	:	**SU 22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	:	**SU1:** Agriculture, forestry, fishery
Chemical product category	:	**PC12:** Fertilizers
Process categories	:	**PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **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
Environmental Release Categories	:	**ERC8b, ERC8e:** Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8e: Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of reactive substances in open systems

Remarks	:	Exposure assessment and risk characterization are not required for environment.

2.2 Contributing scenario controlling worker exposure for: Professional use, General measures
PROC2, PROC5, PROC8a, PROC8b, PROC9, PROC11: Use in closed, continuous process with occasional controlled exposure, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact), Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging)

from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Non industrial spraying, PC12: Fertilizers

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers concentrations up to 100%.
Physical Form (at time of use)	:	Solid, Liquid, Dustiness: Low

Frequency and duration of use

Duration of the acitivity	:	< 8 h

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor
Ventilation rate per hour	:	1 - 3
Remarks	:	Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and measures

Handle substance within a closed system. Provide a good standard of general ventilation (not less than 1 to 3 air changes per hour). Wash off skin contamination immediately.

Organisational measures to prevent /limit releases, dispersion and exposure

Integrated safety management systems

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

Skin protection, Long sleeved clothing, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Effectiveness (of a measure): 90 %)
Safety goggles or face-shield.
Respiratory protection, No (Effectiveness (of a measure): 0 %)

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Minimise number of staff exposed., Effective contaminant extraction., Minimisation of manual phases., Avoidance of contact with contaminated tools and objects., Regular cleaning of equipment, work area and clothing., Handle in accordance with good industrial hygiene and safety practice.

2.4 Contributing scenario controlling worker exposure for: Professional use PROC2: Use in closed, continuous process with occasional controlled exposure

Human factors not influenced by risk management

Dermal exposure	:	Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Use in closed, continuous process with occasional controlled exposure

2.6 Contributing scenario controlling worker exposure for: Professional use PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures No

2.7 Contributing scenario controlling worker exposure for: Professional use PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures No

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

Human factors not influenced by risk management

Dermal exposure : Two hands (960 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.9 Contributing scenario controlling worker exposure for: Professional use PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Human factors not influenced by risk management

Dermal exposure : Palms of both hands (480 cm2)

Technical conditions and measures

Containment measures Semi-closed process with occational controlled exposure

2.10 Contributing scenario controlling worker exposure for: Professional use PROC11: Non industrial spraying

Human factors not influenced by risk management

Dermal exposure : Two hands and upper wrists (1500 cm2)

Technical conditions and measures

Containment measures No

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

Protective clothing, Complete suit protecting against chemicals, Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training., Wearing only gloves is not sufficient. (Effectiveness (of a measure): 96 %)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC8b ERC8e			Other			
Remarks:		Exposure assessment and risk characterization are not required for environment.				

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PROC2	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,01 mg/m³	< 0,01
		Indoor, Systemic, Long term	Dermal	0,137 mg/kg bw/day	0,027
		Systemic, Long term	all routes		0,027
PROC5	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	1 mg/m³	0,028
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268

		Systemic, Long term	all routes		0,296
PROC8a	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,282
PROC8b	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	1,371 mg/kg bw/day	0,268
		Systemic, Long term	all routes		0,282
PROC9	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	0,5 mg/m³	0,014
		Indoor, Systemic, Long term	Dermal	0,686 mg/kg bw/day	0,134
		Systemic, Long term	all routes		0,148
PROC11	ECETOC TRA	Indoor without LEV, Systemic, Long term	Inhalation	1 mg/m³	0,028
		Indoor, Systemic, Long term	Dermal	4,284 mg/kg bw/day	0,837
		Systemic, Long term	all routes		0,865

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.

1. Short title of Exposure Scenario: Consumer use, Wide-dispersive uses

Main User Groups	:	**SU 21:** Consumer uses: Private households (= general public = consumers)
Chemical product category	:	**PC12:** Fertilizers
Environmental Release Categories	:	**ERC8b, ERC8e:** Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8b, ERC8e: Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of reactive substances in open systems

Remarks	:	Exposure assessment and risk characterization are not required for environment.

2.3 Contributing scenario controlling consumer exposure for: Consumer use PC12: Fertilizers

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers concentrations up to 50%.
Physical Form (at time of use)	:	Solid, low dustiness

Frequency and duration of use

Remarks	:	Use frequency: Infrequent

Human factors not influenced by risk management

Dermal exposure	:	Inside hands / one hand / palm of hands (428 cm2)

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor
Outdoor / Indoor	:	Outdoor

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : Keep away from children.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	RCR
ERC8b ERC8e			Other			
Remarks:		Exposure assessment and risk characterization are not required for environment.				

Consumers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	RCR
PC12	ECETOC TRA	Systemic, Long term	Dermal	1,429 mg/kg bw/day	0,558
		Systemic, Long term	all routes		0,558

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

The safety data sheet at hand provides the user with risk management measures and operational conditions which enables him to work safely with the substance / mixture. If other risk management measures / operational conditions are adopted, the user has to ensure, that the risks are managed to at least equivalent levels.