

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## GUANIDINE NITRATE

Version 14.1 / REG\_EU  
Revision Date: 13.03.2020

Specification: 131912  
Material no.:

Date of first issue: 13.03.2020  
Print Date: 14.03.2020

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

#### 1.1 Product identifier

Trade name : GUANIDINE NITRATE  
Registration number : 01-2119452053-50-0000  
CAS-No. : 506-93-4  
EC-No. : 208-060-1

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

Use of the Sub-  
stance/Mixture : Chemical intermediate, Chemical blowing agent

#### 1.3 Details of the supplier of the safety data sheet

Company : AlzChem Trostberg GmbH  
Dr.-Albert-Frank-Str. 32  
83308 Trostberg, Germany  
Telephone : +49 8621 86-3351  
E-mail address of person  
responsible for the SDS : alz-pst@alzchem.com

#### 1.4 Emergency telephone number

Emergency telephone num-  
ber : +49 8621 86-2776  
AlzChem Trostberg GmbH, Fire Brigade

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

##### Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4 H302: Harmful if swallowed.  
Serious eye damage, Category 1 H318: Causes serious eye damage.  
Acute toxicity, Category 4 H332: Harmful if inhaled.

#### 2.2 Label elements

##### Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Danger

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- Hazard statements : H302 Harmful if swallowed.  
H318 Causes serious eye damage.  
H332 Harmful if inhaled.
- Precautionary statements : **Prevention:**  
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.  
P280 Wear protective gloves/protective clothing/eye protection/face protection.
- Response:**  
P301 + P312 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell.  
P330 Rinse mouth.  
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

### 2.3 Other hazards

Not a PBT, vPvB substance as per the criteria of the REACH Ordinance  
The product has been shown not to be oxidizing in a test following Directive 67/548/EEC (Method A17, Oxidizing properties).  
Dusts can form explosive mixtures with air.  
Caution micronized powder! High respirable fraction of particulates.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Substance name : GUANIDINE NITRATE FG

#### Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
Guanidinium nitrate	506-93-4 208-060-1	> 98

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

- General advice : Seek medical advice in case of symptoms caused by eye or skin contact, inhalation or swallowing.
- If inhaled : Move to fresh air.
- In case of skin contact : Remove contaminated or saturated clothing.  
Wash off with plenty of water.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 10 minutes.

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Remove contact lenses if this can be easily done.  
Immediate further treatment in ophthalmic hospital/ ophthalmologist.

If swallowed : Rinse mouth.  
Drink 1 or 2 glasses of water.  
Do not induce vomiting without medical advice.

### 4.2 Most important symptoms and effects, both acute and delayed

None known.

### 4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Symptomatic treatment.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Water spray, foam, CO<sub>2</sub>, dry powder.

Unsuitable extinguishing media : high volume water jet

### 5.2 Special hazards arising from the substance or mixture

Hazardous combustion products : Ammonia  
nitrous gases  
Carbon oxides  
Hydrocyanic acid (HCN)

### 5.3 Advice for firefighters

Special protective equipment for firefighters : In the case of fire, wear respiratory protective equipment independent of surrounding air and chemical protective suit.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Wear personal protective equipment; see section 8.  
Ensure adequate ventilation.  
Avoid dust formation.  
Keep away from open flames, hot surfaces and sources of ignition.

### 6.2 Environmental precautions

Environmental precautions : Product or extinguishing water with product must not be allowed to enter soil, sewers or natural bodies of water.

### 6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Sweep up and shovel.

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Avoid dust formation.  
Keep in suitable, closed containers for disposal.

### 6.4 Reference to other sections

|| For disposal considerations see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Advice on safe handling : Handle in accordance with good industrial hygiene and safety practice.  
Provide sufficient ventilation and exhaust at the workplace.  
Prevent dust formation.

Advice on protection against fire and explosion : Danger of dust explosion Minimum ignition energy ca. 2 - 10 J

In case of release dust: Keep away from combustion sources such as sparks, flames and unprotected light sources Take precautionary measures against static discharges.

Hygiene measures : Do not breathe dust. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. When using, do not eat, drink or smoke. Wash face and/or hands before break and end of work. Keep away from food, drink and animal feedingstuffs.

Dust explosion class : St1

### 7.2 Conditions for safe storage, including any incompatibilities

Further information on storage conditions : Keep containers tightly closed in a cool, well-ventilated place.  
Avoid sun rays, heat, heat effect.

Advice on common storage : Keep away from combustible material.  
See section 10: Materials to avoid

Packaging material : Suitable material: polyethylene, Polypropylene

### 7.3 Specific end use(s)

Specific use(s) : We are unaware of any specific end uses which go beyond the data reported in Section 1.

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:**

Substance name	End Use	Exposure routes	Potential health effects	Value
Guanidinium nitrate	Indirect expo-	Inhalation	Long-term systemic	0,87 mg/m3

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	sure to humans via the environment		effects	
	Indirect exposure to humans via the environment	Oral	Long-term - systemic effects	0,5 mg/kg bw/day
	Worker	Inhalation	Long-term systemic effects	3,5 mg/m <sup>3</sup>
	Worker	Inhalation	Acute systemic effects	10,5 mg/m <sup>3</sup>
	Worker	dermal	Long-term systemic effects	1 mg/kg bw/day

### 8.2 Exposure controls

#### Engineering measures

Control of environmental exposure: see exposure scenario

#### Personal protective equipment

Eye protection : Tightly fitting safety goggles

#### Hand protection

Material : Chloroprene, Recommendation: Camapren 722  
Break through time : 480 min  
Glove thickness : 0,6 mm  
Directive : DIN EN 374  
Manufacturer : Kächele-Cama Latex GmbH (KCL), Germany

Material : Nitrile rubber, Recommendation: Camatril 730  
Break through time : 480 min  
Glove thickness : 0,4 mm  
Directive : DIN EN 374  
Manufacturer : Kächele-Cama Latex GmbH (KCL), Germany

Skin and body protection : Protective clothing  
If intensive contact with the hazardous material cannot be avoided with certainty, order (depending on the hazard involved) additional protective measures for example chemical protective suit.  
for example:  
DuPont™ Tyvek® Classic Xpert (white)

Respiratory protection : Use suitable respiratory protection in the presence of dust.  
Recommendation: Dust mask FFP3 or P3 particle filter

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Appearance : solid

Colour : colourless

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Odour	:	odourless
pH	:	4,9 (25 °C) Concentration: 165 g/l
Melting point/range	:	214 °C
Boiling point/boiling range	:	Decomposition: yes
Flash point	:	Not applicable
Flammability (solid, gas)	:	BZ 1 - does not ignite.
Burning number	:	BZ 1 - does not ignite.
Density	:	1,44 g/cm <sup>3</sup> (20 °C)
Bulk density	:	700 kg/m <sup>3</sup>
Solubility(ies)	:	
Water solubility	:	200 g/l (20 °C)
Solubility in other solvents	:	14 g/l (30 °C) Solvent: Ethanol
Partition coefficient: n-octanol/water	:	log Pow: < -1,7
Auto-ignition temperature	:	> 360 °C Method: Flammability of deposited dust  400 °C Method: Ignition temperature for swirling (airborne) dust
Decomposition temperature	:	Exothermic decomposition at high temperatures.  ca. 250 °C explosive decomposition is possible
Explosive properties	:	Not explosive as defined by EU hazardous substance law. Method: EEC method 92/69/EEC, A 14 The method includes tests for mechanical sensitivity (impact, friction) and thermal sensitivity under inclusion (steel sleeve or Koenen test).  Not explosive as defined by UN dangerous goods regulation. The substance either does not meet all criteria for an explosive substance or is too sensitive to fall under Class 1 of the UN Transport Regulations. Supplementary information: Substances suspected of having explosive properties are officially classified by (e.g. national) authorities. Results listed in UN Test Manual (Transport of Hazardous

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Goods).  
UN Splitting Test (transference of the detonation shock of an input load):  
Sensitive to detonation impact (detonator cap)

Oxidizing properties : The product has been shown not to be oxidizing in a test following Directive 67/548/EEC (Method A17, Oxidizing properties).  
GLP: yes

### 9.2 Other information

Impact sensitivity : not sensitive to impact  
Method: BAM (Fed. Ger. Mat. Test Inst.) drop-weight test

: Not sensitive to rubbing

Molecular weight : 122,09 g/mol

Dust explosion class : St1

Minimum ignition energy : ca. 2 - 10 J

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

See section 10.3

### 10.2 Chemical stability

No decomposition if used as directed.

### 10.3 Possibility of hazardous reactions

Hazardous reactions : Reacts violently exothermic with:  
Chlorocarbons  
Acids  
Explosive decomposition with combustible materials possible.

### 10.4 Conditions to avoid

Conditions to avoid : temperatures > 214 °C  
decomposition

### 10.5 Incompatible materials

Materials to avoid : Strong acids and strong bases  
combustible substances  
Halogenated compounds

### 10.6 Hazardous decomposition products

decomposition products if heated above melting point.  
nitrous gases  
Nitric acid  
ammonia

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### SECTION 11: Toxicological information

#### 11.1 Information on toxicological effects

##### Acute toxicity

###### Product:

Acute oral toxicity : Assessment: Harmful if swallowed.

Acute inhalation toxicity : Assessment: Harmful if inhaled.

###### Components:

###### **Guanidinium nitrate:**

Acute oral toxicity : LD50 (Rat, male): 989,6 mg/kg  
Method: EPA Methode

LD50 (rat, female): 729,8 mg/kg  
Method: EPA Methode  
Assessment: Harmful if swallowed.  
Remarks: Own study, IUCLID

Acute inhalation toxicity : LC50 (Rat, male/female): > 0,853 mg/l  
Exposure time: 4 h  
Method: OECD Test Guideline 403  
Remarks: the maximum dose attainable under experimental conditions no fatalities  
Own study, IUCLID  
  
Assessment: Harmful if inhaled.  
Remarks: The data are derived from the evaluations or test results achieved with similar products (conclusion by analogy).

Acute dermal toxicity : LD50 (Rabbit): > 2000 mg/kg  
Method: EPA Methode  
Assessment: Based on available data, the classification criteria are not met.  
Remarks: Own study, IUCLID

##### Skin corrosion/irritation

###### Components:

###### **Guanidinium nitrate:**

Species : Rabbit  
Method : OECD Test Guideline 404  
Result : not irritating  
Remarks : Own study, IUCLID



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### Serious eye damage/eye irritation

#### Product:

Assessment : Causes serious eye damage.

#### Components:

##### **Guanidinium nitrate:**

Species : Rabbit  
Assessment : Causes serious eye damage.  
Method : US-EPA-method  
Result : irreversible damages  
Remarks : Own study, IUCLID

### Respiratory or skin sensitisation

#### Components:

##### **Guanidinium nitrate:**

Species : Guinea pig  
Method : OECD Test Guideline 406  
Result : not sensitizing to the skin  
Remarks : Own study, IUCLID

### Germ cell mutagenicity

#### Components:

##### **Guanidinium nitrate:**

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro  
Result: negative  
Remarks: Own study  
  
Test Type: Ames test  
Result: negative  
Remarks: Own study

### Carcinogenicity

#### Product:

Carcinogenicity - Assessment : no data available

#### Components:

##### **Guanidinium nitrate:**

Carcinogenicity - Assessment : no data available

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### Reproductive toxicity

#### Components:

##### Guanidinium nitrate:

Effects on foetal development : Species: Rat  
General Toxicity Maternal: NOAEL: 150 mg/kg body weight  
Teratogenicity: NOAEL: 350 mg/kg body weight  
Method: OECD Test Guideline 414  
The value is given in analogy to the following substances:  
Guanidine hydrochloride

### STOT - single exposure

#### Product:

Remarks : no data available

#### Components:

##### Guanidinium nitrate:

Remarks : no data available

### STOT - repeated exposure

#### Product:

Remarks : no data available

### Repeated dose toxicity

#### Components:

##### Guanidinium nitrate:

Species : Rat  
NOAEL : 100 mg/kg  
Exposure time : 90-day  
Method : OECD 408  
The value is given in analogy to the following substances: Guanidine hydrochloride

### Aspiration toxicity

#### Product:

no data available

#### Components:

##### Guanidinium nitrate:

No data available

### Further information

#### Product:

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Remarks : No additional toxicological data are available.

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

##### **Guanidinium nitrate:**

- Toxicity to fish : LC50 (Leuciscus idus): 2420 mg/l  
Exposure time: 48 h  
Remarks: Own test result.
- LC50 (Pimephales promelas): 690 mg/l  
Exposure time: 96 h  
Remarks: Own test result.
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna): 70,2 mg/l  
Exposure time: 48 h  
Remarks: Own test result.
- NOEC (Daphnia magna): 2,9 mg/l  
Exposure time: 21 d  
Remarks: Own test result.
- Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 55 mg/l  
Exposure time: 72 h
- ErC50 (Pseudokirchneriella subcapitata): 33,5 mg/l  
Exposure time: 72 h  
Remarks: Own test result.
- NOEC (Pseudokirchneriella subcapitata): 6,3 mg/l  
Exposure time: 72 h  
Remarks: Own test result.
- Toxicity to microorganisms : EC 10 (Pseudomonas putida): 832 mg/l  
Remarks: Own test result.

### 12.2 Persistence and degradability

#### Components:

##### **Guanidinium nitrate:**

- Biodegradability : Result: The product is mineralized rapidly in the soil.  
Remarks: biodegradable  
Own study

### 12.3 Bioaccumulative potential

#### Product:

- Bioaccumulation : Remarks: No bioaccumulation is to be expected (log Pow <=

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4).

### Components:

#### **Guanidinium nitrate:**

Partition coefficient: n-octanol/water : log Pow: < -1,7

### 12.4 Mobility in soil

no data available

### 12.5 Results of PBT and vPvB assessment

#### Product:

Assessment : Not a PBT, vPvB substance as per the criteria of the REACH Ordinance.

### 12.6 Other adverse effects

#### Product:

Additional ecological information : No further ecotoxicological data are available.

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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

Product : Must be brought to an adequate waste treatment facility, in conformity with applicable waste disposal regulations.

Contaminated packaging : Packaging, that can not be reused after cleaning must be disposed or recycled in accordance with all federal, national and local regulations.

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## SECTION 14: Transport information

### 14.1 UN number

ADR : UN 1467

RID : UN 1467

IMDG : UN 1467

IATA : UN 1467

### 14.2 UN proper shipping name

ADR : GUANIDINE NITRATE

RID : GUANIDINE NITRATE

IMDG : GUANIDINE NITRATE

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**IATA** : Guanidine nitrate

### 14.3 Transport hazard class(es)

**ADR** : 5.1

**RID** : 5.1

**IMDG** : 5.1

**IATA** : 5.1

### 14.4 Packing group

#### **ADR**

Packing group : III

Classification Code : O2

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-A, S-Q

Remarks : "Separated from" chlorates.

#### **IATA (Cargo)**

Packing instruction (cargo aircraft) : 563

Packing instruction (LQ) : Y546

Packing group : III

Labels : Oxidizer

Remarks : ERG-Code 5L

#### **IATA\_P (Passenger)**

Packing instruction (passenger aircraft) : 559

Packing instruction (LQ) : Y546

Packing group : III

Labels : Oxidizer

Remarks : ERG-Code 5L

### 14.5 Environmental hazards

#### **ADR**

Environmentally hazardous : no

#### **RID**

Environmentally hazardous : no

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### IMDG

Marine pollutant : no

### 14.6 Special precautions for user

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

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

Not applicable for product as supplied.

## SECTION 15: Regulatory information

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

### 15.2 Chemical safety assessment

A substance safety assessment was carried out for this product.

## SECTION 16: Other information

### Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International

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Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

### Further information

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

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## Annex: Exposure Scenarios

### Table of Contents

Number	Title
ES 1	Worker (industrial) - Formulation and Re-Packing
ES 2	Worker (industrial) - formulation of explosives
ES 3	Worker (industrial) - Formulation and Re-Packing
ES 4	Worker (industrial) - Use as an Intermediate
ES 5	Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags
ES 6	Worker (industrial) - Use as Coating
ES 7	Worker (occupational) - Fertiliser application



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### ES 1: Worker (industrial) - Formulation and Re-Packing

#### 1.1. Title section

<b>Structured Short Title</b>	: Worker (industrial) - Formulation and Re-Packing
-------------------------------	--

Environment		
CS 1	Worker (industrial) - Formulation and Re-Packing	ERC2
Worker		
CS 2	Worker (industrial) - Manufacturing	PROC5
CS 3	Worker (industrial) - Manufacturing	PROC8b
CS 4	Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC14
CS 5	Worker (industrial) - Manufacturing	PROC15

#### 1.2. Conditions of use affecting exposure

##### 1.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 2500 kg 100 %
Annual amount per site	: 500000 kg
Release type	: Continuous release
Emission days	: 200
Technical and organisational conditions and measures	
Filtration	Air - minimum efficiency of 99,9 %
Conditions and measures related to sewage treatment plant	
STP type	: Municipal STP
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2000 m <sup>3</sup> /d
efficiency of sewage treatment plant	: 0,02 %

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Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: See Section 13 of the Safety Data Sheet.
Other conditions affecting environmental exposure	
Receiving surface water flow	: 18000 m <sup>3</sup> /d
Indoor or outdoor use	: Indoor use

### 1.2.2. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Product (article) characteristics	
Covers concentrations up to 1,0 %	
Physical form of product	: solid slightly dusty
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 8 h
Technical and organisational conditions and measures	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

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### 1.2.3. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Product (article) characteristics	
Covers concentrations up to 1 %	
Physical form of product	: solid slightly dusty
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration	: duration of activity < 8 h
Technical and organisational conditions and measures	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 % Inhalation - minimum efficiency of 0 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	
Occupational Health and Safety Management System: Advanced	

### 1.2.4. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Product (article) characteristics	
Covers concentrations up to 1 %	
Physical form of product	: solid slightly dusty

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<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Use suitable eye protection. Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 0 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

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

<b>Product (article) characteristics</b>	
Covers concentrations up to 1,0 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374.	

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Dermal - minimum efficiency of 80 % Inhalation - minimum efficiency of 0 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

### 1.3. Exposure estimation and reference to its source

#### 1.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
Water	25 kg/day	Estimated release factor
Air	0,025 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Man via environment - Inhalation	0,000002 mg/m <sup>3</sup> (EUSES)	< 0,01
Man via environment - Oral	0,012 mg/kg bw/day (EUSES)	0,023
Secondary poisoning - combined routes		0,023

#### 1.3.2. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,014 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01

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inhalative	local	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,014 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,274
dermal	local	long-term	0,04 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,275
combined routes	systemic	short-term		< 0,01

### 1.3.3. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,002 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,002 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,274
dermal	local	long-term	0,02 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,274
combined routes	systemic	short-term		< 0,01

### 1.3.4. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

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Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,003 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,003 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,343 mg/kg bw/day (ECETOC TRA worker v3)	0,343
dermal	local	long-term	0,05 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	short-term		< 0,01
combined routes	systemic	long-term		0,343

### 1.3.5. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,003 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,003 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	0,034
dermal	local	long-term	0,01 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	

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combined routes	systemic	long-term		0,034
combined routes	systemic	short-term		< 0,01

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

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.



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### ES 2: Worker (industrial) - formulation of explosives

#### 2.1. Title section

<b>Structured Short Title</b>	: Worker (industrial) - formulation of explosives
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Environment		
CS 1	Worker (industrial) - formulation of explosives	ERC2
Worker		
CS 2	Worker (industrial) - formulation of explosives	PROC3
CS 3	Worker (industrial) - formulation of explosives	PROC8b
CS 4	Worker (industrial) - formulation of explosives	PROC15

#### 2.2. Conditions of use affecting exposure

##### 2.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 11000 kg 100 %
Annual amount per site	: 2200000 kg
Release type	: Continuous release
Emission days	: 200
Technical and organisational conditions and measures	
Filtration Air - minimum efficiency of 99,9 %	
Conditions and measures related to sewage treatment plant	
STP type	: Municipal STP
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2000 m <sup>3</sup> /d
efficiency of sewage treatment plant	: 0,014 %
Conditions and measures related to treatment of waste (including article waste)	

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Waste treatment	:	See Section 13 of the Safety Data Sheet.
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	18000 m <sup>3</sup> /d
Indoor or outdoor use	:	Indoor use

### 2.2.2. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers concentrations up to 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Use suitable eye protection.	
Wear a respirator conforming to EN140.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
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### 2.2.3. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>	
Covers concentrations up to 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 95 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

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

<b>Product (article) characteristics</b>	
Covers concentrations up to 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	

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Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

### 2.3. Exposure estimation and reference to its source

#### 2.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
Water	55 kg/day	Estimated release factor
Air	0,022 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Secondary Poisoning - inhalative	0,0000017 mg/m <sup>3</sup> (EUSES)	< 0,01
Secondary poisoning - oral	0,026 mg/kg bw/day (EUSES)	0,051
Secondary poisoning - combined routes		0,051

#### 2.3.2. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indica-	Exposure esti-	RCR
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		tor	mate	
inhalative	systemic	long-term	0,001 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,002 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,001 (ECETOC TRA worker v3)	
inhalative	local	short-term	0,002 (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,414 mg/kg bw/day (ECETOC TRA worker v3)	0,414
dermal	local	long-term	0,121 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,414
combined routes	systemic	short-term		< 0,01

### 2.3.3. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,002 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,009 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,002 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,009 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	0,823
dermal	local	long-term	0,06 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,823

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combined routes	systemic	short-term		< 0,01
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### 2.3.4. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,017 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,017 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	0,041
dermal	local	long-term	0,012 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,042
combined routes	systemic	short-term		< 0,01

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

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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### ES 3: Worker (industrial) - Formulation and Re-Packing

#### 3.1. Title section

<b>Structured Short Title</b>	: Worker (industrial) - Formulation and Re-Packing
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Environment		
CS 1	Formulation of preparations	ERC2
Worker		
CS 2	Use in closed batch process (synthesis or formulation)	PROC3

#### 3.2. Conditions of use affecting exposure

##### 3.2.1. Control of environmental exposure: Formulation of preparations (ERC2)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 4,5 kg
Annual amount per site	: 1035 kg
Release type	: Continuous release
Emission days	: 230
Technical and organisational conditions and measures	
Filtration Air - minimum efficiency of 99,9 %	
Conditions and measures related to sewage treatment plant	
STP type	: Municipal STP
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2000 m <sup>3</sup> /d
efficiency of sewage treatment plant	: 0,02 %
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: See Section 13 of the Safety Data Sheet.
Other conditions affecting environmental exposure	

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Receiving surface water flow	:	18000 m <sup>3</sup> /d
Indoor or outdoor use	:	Indoor use

### 3.2.2. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>
Covers percentage substance in the product up to 5%.
Physical form of product : Liquid mixture
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>
Duration : Application duration < 8 h
<b>Technical and organisational conditions and measures</b>
Local exhaust ventilation Inhalation - minimum efficiency of 90 %
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %
Use suitable eye protection.
For further specification, refer to section 8 of the SDS.
<b>Other conditions affecting workers exposure</b>
Indoor or outdoor use : Indoor use.
Professional or industrial settings : Industrial use
Temperature : Covers use at ambient temperatures.
Ventilation rate per hour : 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>
Occupational Health and Safety Management System: Advanced

### 3.3. Exposure estimation and reference to its source

#### 3.3.1. Environmental release and exposure: Formulation of preparations (ERC2)

Release route	Release rate	Release estimation method
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Water	0,09 kg/day	Estimated release factor
Air	0,001 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Secondary Poisoning - inhalative	0,0000001 mg/m <sup>3</sup> (EUSES v2.1)	< 0,01
Secondary poisoning - combined routes		< 0,01
Secondary poisoning - oral	0,000114 mg/kg bw/day (EUSES v2.1)	< 0,01

### 3.3.2. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,014 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,056 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,014 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,056 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,028 mg/kg bw/day (ECETOC TRA worker v3)	0,028
dermal	local	long-term	0,008 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,032
combined routes	systemic	short-term		< 0,01

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

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

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|| If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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### ES 4: Worker (industrial) - Use as an Intermediate

#### 4.1. Title section

<b>Structured Short Title</b>	: Worker (industrial) - Use as an Intermediate
-------------------------------	--

Environment		
CS 1	Worker (industrial) - Use as an Intermediate	ERC6a
Worker		
CS 2	Worker (industrial) - Use as an Intermediate	PROC3
CS 3	Worker (industrial) - Use as an Intermediate	PROC8b

#### 4.2. Conditions of use affecting exposure

##### 4.2.1. Control of environmental exposure: Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 24000 kg 100 %
Annual amount per site	: 4800000 kg
Release type	: Continuous release
Emission days	: 200
Technical and organisational conditions and measures	
Filtration Air - minimum efficiency of 99,9 %	
Conditions and measures related to sewage treatment plant	
STP type	: Municipal STP
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2000 m <sup>3</sup> /d
efficiency of sewage treatment plant	: 0,02 %
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: See Section 13 of the Safety Data Sheet.

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<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18000 m <sup>3</sup> /d
Indoor or outdoor use	: Indoor use
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Use in closed process	

### 4.2.2. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers concentrations up to 100 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

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### 4.2.3. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

<b>Product (article) characteristics</b>	
Covers concentrations up to 100 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

### 4.3. Exposure estimation and reference to its source

#### 4.3.1. Environmental release and exposure: Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a)

Release route	Release rate	Release estimation method
Water	24 kg/day	Estimated release factor
Air	0,024 kg/day	Estimated release factor

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Protection Target	Exposure estimate	RCR
Secondary Poisoning - inhalative	0,000004 mg/m <sup>3</sup> (EUSES)	< 0,01
Secondary poisoning - oral	0,022 mg/kg bw/day (EUSES)	0,045
Secondary poisoning - combined routes		0,045

### 4.3.2. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,007 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,028 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,007 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,028 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,138 mg/kg bw/day (ECETOC TRA worker v3)	0,138
dermal	local	long-term	0,04 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,14
combined routes	systemic	short-term		< 0,01

### 4.3.3. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,014 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01

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inhalative	local	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,014 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,685 mg/kg bw/day (ECETOC TRA worker v3)	0,685
dermal	local	long-term	0,05 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,686
combined routes	systemic	short-term		< 0,01

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

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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### ES 5: Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags

#### 5.1. Title section

<b>Structured Short Title</b>	: Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags
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Environment		
CS 1	Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags	ERC5
Worker		
CS 2	Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags	PROC3
CS 3	Worker (industrial) - Formulation and Re-Packing	PROC5
CS 4	Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags	PROC8b
CS 5	Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags	PROC9
CS 6	Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags	PROC14
CS 7	Worker (industrial) - manufacturing of explosives, pyrotechnic articles or airbags	PROC15

#### 5.2. Conditions of use affecting exposure

##### 5.2.1. Control of environmental exposure: Industrial use resulting in inclusion into or onto a matrix (ERC5)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 11000 kg 100 %
Annual amount per site	: 2200000 kg
Release type	: Continuous release
Emission days	: 200
Technical and organisational conditions and measures	



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Filtration Air - minimum efficiency of 99,9 %	
<b>Conditions and measures related to sewage treatment plant</b>	
STP type	: Municipal STP
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2000 m <sup>3</sup> /d
efficiency of sewage treatment plant	: 0,02 %
<b>Conditions and measures related to treatment of waste (including article waste)</b>	
Waste treatment	: See Section 13 of the Safety Data Sheet.
<b>Other conditions affecting environmental exposure</b>	
Receiving surface water flow	: 18000 m <sup>3</sup> /d
Indoor or outdoor use	: Indoor use

### 5.2.2. Control of worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

<b>Product (article) characteristics</b>	
Covers concentrations up to 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.

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Temperature	:	Covers use at ambient temperatures.
Ventilation rate per hour	:	3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>		
Occupational Health and Safety Management System: Advanced		

### 5.2.3. Control of worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

<b>Product (article) characteristics</b>	
Covers percentage substance in the product up to 25 %. 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

### 5.2.4. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

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<b>Product (article) characteristics</b>	
Covers concentrations up to 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 95 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

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

<b>Product (article) characteristics</b>	
Covers concentrations up to 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h

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<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoor use.
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

### 5.2.6. Control of worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

<b>Product (article) characteristics</b>	
Covers concentrations up to 25 %	
Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Dermal - minimum efficiency of 0 % Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Use suitable eye protection.	

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For further specification, refer to section 8 of the SDS.

### Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use.

Temperature : Covers use at ambient temperatures.

Ventilation rate per hour : 3 - 5

**Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply**

Occupational Health and Safety Management System: Advanced

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

#### Product (article) characteristics

Covers concentrations up to 25 %

Physical form of product : solid  
slightly dusty

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

Duration : duration of activity < 8 h

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.  
Dermal - minimum efficiency of 80 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

### Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use.

Temperature : Covers use at ambient temperatures.

Ventilation rate per hour : 3 - 5

**Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply**

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### 5.3. Exposure estimation and reference to its source

#### 5.3.1. Environmental release and exposure: Industrial use resulting in inclusion into or onto a matrix (ERC5)

Release route	Release rate	Release estimation method
Water	55 kg/day	Estimated release factor
Air	0,022 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Secondary Poisoning - inhalative	0,000002 mg/m <sup>3</sup> (EUSES)	< 0,01
Secondary poisoning - oral	0,026 mg/kg bw/day (EUSES)	0,051
Secondary poisoning - combined routes		0,051

#### 5.3.2. Worker exposure: Use in closed batch process (synthesis or formulation) (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,017 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,004 mg/m <sup>3</sup> (Qualitative approach)	
inhalative	local	short-term	0,017 mg/m <sup>3</sup> (Qualitative approach)	
dermal	systemic	long-term	0,083 mg/kg bw/day (ECETOC TRA worker v3)	0,083
dermal	local	long-term	0,024 mg/cm <sup>2</sup> (Qualitative approach)	
combined routes	systemic	long-term		0,084
combined routes	systemic	short-term		< 0,01

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### 5.3.3. Worker exposure: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,021 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,084 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,021 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,084 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	0,823
dermal	local	long-term	0,12 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,829
combined routes	systemic	short-term		< 0,01

### 5.3.4. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,002 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,009 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,002 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,009 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,823 mg/kg bw/day (ECETOC	0,823

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			TRA worker v3)	
dermal	local	long-term	0,06 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,823
combined routes	systemic	short-term		< 0,01

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,017 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	local	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,017 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	0,823
dermal	local	long-term	0,12 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,824
combined routes	systemic	short-term		< 0,01

### 5.3.6. Worker exposure: Production of preparations or articles by tableting, compression, extrusion, pelletisation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,017 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01



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inhalative	local	long-term	0,004 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,017 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,412 mg/kg bw/day (ECETOC TRA worker v3)	0,412
dermal	local	long-term	0,06 mg/cm <sup>2</sup> (Quali- tative approach)	
combined routes	systemic	long-term		0,413
combined routes	systemic	short-term		< 0,01

### 5.3.7. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indica- tor	Exposure esti- mate	RCR
inhalative	systemic	long-term	0,042 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,012
inhalative	systemic	short-term	0,168 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,016
inhalative	local	long-term	0,042 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,168 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	0,041
dermal	local	long-term	0,012 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,053
combined routes	systemic	short-term		0,016

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

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

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Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

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### ES 6: Worker (industrial) - Use as Coating

#### 6.1. Title section

<b>Structured Short Title</b>	: Worker (industrial) - Use as Coating
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Environment		
CS 1	Industrial use of processing aids in processes and products, not becoming part of articles	ERC4
Worker		
CS 2	Industrial spraying	PROC7
CS 3	Roller application or brushing	PROC10
CS 4	Treatment of articles by dipping and pouring	PROC13

#### 6.2. Conditions of use affecting exposure

##### 6.2.1. Control of environmental exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 4,5 kg
Annual amount per site	: 1035 kg
Release type	: Continuous release
Emission days	: 230
Technical and organisational conditions and measures	
Filtration Air - minimum efficiency of 99,9 %	
Conditions and measures related to sewage treatment plant	
STP type	: Municipal STP
STP sludge treatment	: Controlled application of sewage sludge to agricultural soil
STP effluent	: 2000 m <sup>3</sup> /d
efficiency of sewage treatment plant	: 0,02 %
Conditions and measures related to treatment of waste (including article waste)	

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Waste treatment	:	See Section 13 of the Safety Data Sheet.
<b>Other conditions affecting environmental exposure</b>		
Receiving surface water flow	:	18000 m <sup>3</sup> /d
Indoor or outdoor use	:	Indoor use

### 6.2.2. Control of worker exposure: Industrial spraying (PROC7)

<b>Product (article) characteristics</b>	
Covers concentrations up to 5 %	
Physical form of product	: Liquid mixture
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Dermal - minimum efficiency of 95 % Inhalation - minimum efficiency of 95 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
Wear a respirator conforming to EN140. Inhalation - minimum efficiency of 90 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoors.
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

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### 6.2.3. Control of worker exposure: Roller application or brushing (PROC10)

<b>Product (article) characteristics</b>	
Covers concentrations up to 5 %	
Physical form of product	: Liquid mixture
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Technical and organisational conditions and measures</b>	
Local exhaust ventilation Inhalation - minimum efficiency of 90 %	
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. Dermal - minimum efficiency of 95 %	
Use suitable eye protection.	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Indoors.
Professional or industrial settings	: Industrial use
Temperature	: Covers use at ambient temperatures.
Ventilation rate per hour	: 3 - 5
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Occupational Health and Safety Management System: Advanced	

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

<b>Product (article) characteristics</b>	
Covers concentrations up to 5 %	
Physical form of product	: Liquid mixture
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h

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### Technical and organisational conditions and measures

Local exhaust ventilation  
Inhalation - minimum efficiency of 90 %

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.  
Dermal - minimum efficiency of 90 %

Use suitable eye protection.

For further specification, refer to section 8 of the SDS.

### Other conditions affecting workers exposure

Indoor or outdoor use : Indoor use

Professional or industrial settings : Industrial use

Temperature : Covers use at ambient temperatures.

Ventilation rate per hour : 3 - 5

### Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply

Occupational Health and Safety Management System: Advanced

## 6.3. Exposure estimation and reference to its source

### 6.3.1. Environmental release and exposure: Industrial use of processing aids in processes and products, not becoming part of articles (ERC4)

Release route	Release rate	Release estimation method
Water	4,5 kg/day	Estimated release factor
Air	0,005 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Secondary Poisoning - inhalative	0,0000008 mg/m <sup>3</sup> (EUSES v2.1)	< 0,01
Secondary poisoning - oral	0,00516 mg/kg bw/day (EUSES v2.1)	0,01
Secondary poisoning - combined routes		0,01

### 6.3.2. Worker exposure: Industrial spraying (PROC7)

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Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,02
inhalative	systemic	short-term	0,28 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,027
inhalative	local	long-term	0,07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,28 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,086 mg/kg bw/day (ECETOC TRA worker v3)	0,086
dermal	local	long-term	0,004 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,106
combined routes	systemic	short-term		0,027

### 6.3.3. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,14 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,04
inhalative	systemic	short-term	0,56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,053
inhalative	local	long-term	0,14 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,56 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,274
dermal	local	long-term	0,02 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	

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combined routes	systemic	long-term		0,314
combined routes	systemic	short-term		0,053

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

Exposure route	Health effect	Exposure indicator	Exposure estimate	RCR
inhalative	systemic	long-term	0,07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,02
inhalative	systemic	short-term	0,28 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,027
inhalative	local	long-term	0,07 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,28 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,274
dermal	local	long-term	0,04 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,294
combined routes	systemic	short-term		0,027

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

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.  
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.



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### ES 7: Worker (occupational) - Fertiliser application

#### 7.1. Title section

<b>Structured Short Title</b>	: Worker (occupational) - Fertiliser application
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Environment		
CS 1	Wide dispersive outdoor use of reactive substances in open systems	ERC8e
Worker		
CS 2	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities	PROC8a

#### 7.2. Conditions of use affecting exposure

##### 7.2.1. Control of environmental exposure: Wide dispersive outdoor use of reactive substances in open systems (ERC8e)

Amount used (or contained in articles), frequency and duration of use/exposure	
Daily amount per site	: 0,25 kg
Conditions and measures related to sewage treatment plant	
STP type	: Municipal STP
efficiency of sewage treatment plant	: 0,02 %
Conditions and measures related to treatment of waste (including article waste)	
Waste treatment	: See Section 13 of the Safety Data Sheet.
Other conditions affecting environmental exposure	
Indoor or outdoor use	: Outdoor use

##### 7.2.2. Control of worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Product (article) characteristics
Covers concentrations up to 1 %

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Physical form of product	: solid slightly dusty
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	
Duration	: duration of activity < 8 h
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	
Wear suitable gloves tested to EN374. Dermal - minimum efficiency of 80 %	
For further specification, refer to section 8 of the SDS.	
<b>Other conditions affecting workers exposure</b>	
Indoor or outdoor use	: Outdoor use.
Professional or industrial settings	: Professional use
Temperature	: Covers use at ambient temperatures.
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	
Basic Occupational Health and Safety Management System	

### 7.3. Exposure estimation and reference to its source

#### 7.3.1. Environmental release and exposure: Wide dispersive outdoor use of reactive substances in open systems (ERC8e)

Release route	Release rate	Release estimation method
Water	0,005 kg/day	Estimated release factor
Air	0 kg/day	Estimated release factor

Protection Target	Exposure estimate	RCR
Secondary Poisoning - inhalative	0 mg/m <sup>3</sup> (EUSES v2.1)	< 0,01
Secondary poisoning - oral	0,00002 mg/kg bw/day (EUSES v2.1)	< 0,01
Secondary poisoning - combined routes		< 0,01

#### 7.3.2. Worker exposure: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities (PROC8a)

Exposure route	Health effect	Exposure indica-	Exposure esti-	RCR
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		tor	mate	
inhalative	systemic	long-term	0,035 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0,01
inhalative	systemic	short-term	0,14 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,013
inhalative	local	long-term	0,035 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
inhalative	local	short-term	0,14 mg/m <sup>3</sup> (ECETOC TRA worker v3)	
dermal	systemic	long-term	0,274 mg/kg bw/day (ECETOC TRA worker v3)	0,274
dermal	local	long-term	0,02 mg/cm <sup>2</sup> (ECETOC TRA worker v3)	
combined routes	systemic	long-term		0,284
combined routes	systemic	short-term		0,013

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

In addition to the displayed PROC all PROC could be regarded as safe uses that could be deduced from "PROC Inclusion Hierarchy" (CEFIC, 2011-07-13)

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.  
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.