SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

OXALIC ACID / BAG 25 KG

Version 3.1 Print Date 06.10.2012

Revision Date 05.10.2012

1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name	:	OXALIC ACID / BAG 25 KG
Substance name	:	oxalic acid dihydrate
EC-No.	:	205-634-3

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

Use of the Substance/Mixture	:	Identified use: See table in front of appendix for a complete overview of identified uses.
Uses advised against	:	At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company	:	Brenntag Nordic A/S Borupvang 5 B DK 2750 Ballerup
Telephone	:	+45 43 29 28 00
Telefax	:	+45 43 29 27 00
E-mail address	:	SDS.DK@brenntag-nordic.com
Responsible/issuing person	:	Environment & Quality

1.4. Emergency telephone number

Emergency telephone number	:	In case of personal injury call: Denmark: 82 12 12 12 Giftlinien, Bispebjerg Hospital Finland: Poison Information Centre: (09) 471 977 (direct) or (09) 47 11 (exchange), open 24h/day Norway: 22 59 13 00 Giftinformasjonen (døgnåpent) Sweden: +46-8-331231 Giftinformationscentralen (24 hour service) Outside these countries: Please call your local emergency services

2. Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	**Hazard category**	**Target Organs**	**Hazard statements**
Acute toxicity (Dermal)	Category 4	---	H312
Acute toxicity (Oral)	Category 4	---	H302
Serious eye damage/eye irritation	Category 1	---	H318

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

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Directive 67/548/EEC or 1999/45/EC	
Hazard symbol / Category of danger	**Risk phrases**
Harmful (Xn)	R21/22, R41

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

Most important adverse effects

Human Health : See section 11 for toxicological information.

Physical and chemical hazards : See section 9 for physicochemical information.

Potential environmental effects : See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :

Signal word : Danger

Hazard statements : H302 Harmful if swallowed.

		H312	Harmful in contact with skin.
		H318	Causes serious eye damage.
Precautionary statements			
Prevention	:	P264	Wash skin thoroughly after handling.
		P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	:	P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
		P305 + P310	IF IN EYES: Immediately call a POISON CENTER or doctor/ physician.
		P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
Disposal	:	P501	Dispose of contents/ container to an approved waste disposal plant.

Additional Labelling:

EUH210 Safety data sheet available on request.

Hazardous components which must be listed on the label:

• oxalic acid dihydrate

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

3. Composition/information on ingredients

3.1. Substances

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)		Classification (67/548/EEC)
		Hazard class / Hazard category	Hazard statements	
oxalic acid dihydrate				

Index-No. : 607-006-00-8 CAS-No. : 6153-56-6 EC-No. : 205-634-3	<= 100	Acute Tox.4 Acute Tox.4 Eye Dam.1	H312 H302 H318	Xn; R21/22 Xi; R41

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

4. First aid measures

4.1. Description of first aid measures

General advice : Never give liquids or provoke vomiting when patient is unconscious or in cramp.

If inhaled : Move to fresh air.

In case of skin contact : Brush of. Wash off immediately with plenty of water. Take off all contaminated clothing immediately. If symptoms call a physician.

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 5 minutes. Consult a physician.

If swallowed : Rinse mouth with water. Drink plenty of water. Do NOT induce vomiting. Obtain medical attention.

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

Symptoms : See Section 11 for more detailed information on health effects and symptoms.

Effects : See Section 11 for more detailed information on health effects and symptoms.

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

Treatment : Treat symptomatically.
No further information available.

5. Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	:	Water spray, foam, dry powder or CO2. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	No information available.

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting	:	Carbon monoxide, Carbon dioxide (CO2)

5.3. Advice for firefighters

Special protective equipment for firefighters	:	Wear self contained breathing apparatus for fire fighting if necessary.
Further information	:	No further information available.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Remove all sources of ignition. Keep away unprotected persons. Avoid open flame Ensure adequate ventilation, especially in confined areas. Avoid contact with the skin and the eyes.

6.2. Environmental precautions

Environmental precautions	:	In case of large spillage contact the local authority. The product should not be allowed to enter drains, water courses or the soil. Sweep up or vacuum up spillage and collect in suitable container for disposal.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up	:	Do not create a powder cloud by using a brush or compressed air. After cleaning, flush away traces with water. Pick up and transfer to properly labelled containers.

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

7. Handling and storage

7.1. Precautions for safe handling

Advice on safe handling : Avoid inhalation, ingestion and contact with skin and eyes. Ensure adequate ventilation, especially in confined areas. Do not wear contact lences when handling this product.

Hygiene measures : Keep away from food, drink and animal feedingstuffs.

7.2. Conditions for safe storage, including any incompatibilities

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

Advice on common storage : Materials to avoid: Incompatible with strong acids and oxidizing agents.

7.3. Specific end use(s)

Specific use(s) : Identified use: See table in front of appendix for a complete overview of identified uses.

8. Exposure controls/personal protection

8.1. Control parameters

Component: oxalic acid dihydrate		CAS-No. 6153-56-6
Derived No Effect Level (DNEL)		
Workers, Acute - local effects, Skin contact	:	0,69 mg/cm2
Workers, Long-term - systemic effects, Skin contact	:	2,29 mg/kg bw/day
Workers, Long-term - systemic effects, Inhalation	:	4,03 mg/m3
Population, Acute - local effects, Skin contact	:	0,35 mg/cm2
Population, Long-term - systemic effects, Skin contact	:	1,14 mg/kg bw/day
Population, Long-term - systemic effects, Ingestion	:	1,14 mg/m3

Predicted No Effect Concentration (PNEC)		
Fresh water	:	0,1622 mg/l
Marine water	:	0,01622 mg/l
Intermittent releases	:	1,622 mg/l

Other Occupational Exposure Limit Values

GV (DK), Threshold Limit Values (TLV):
1 mg/m3

EU ELV, Time Weighted Average (TWA):
1 mg/m3
Indicative

8.2. Exposure controls

Personal protective equipment

Respiratory protection

Advice : Dust-mask
Recommended Filter type:P

Hand protection

Advice : Wear suitable gloves.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Material : Natural Rubber
Break through time : >= 8 h
Glove thickness : 0,5 mm

Material : Nitrile rubber
Break through time : >= 8 h

Glove thickness	:	0,35 mm

Eye protection

Advice	:	Tightly fitting safety goggles

Skin and body protection

Advice	:	Wear suitable protective clothing.

Environmental exposure controls

General advice	:	In case of large spillage contact the local authority. The product should not be allowed to enter drains, water courses or the soil. Sweep up or vacuum up spillage and collect in suitable container for disposal.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	:	powder crystalline
Colour	:	colourless
Odour	:	odourless
Odour Threshold	:	not applicable
pH	:	0,7 (50 g/l)
Freezing point	:	not applicable
Boiling point	:	not applicable
Flash point	:	not applicable
Evaporation rate	:	not applicable
Flammability (solid, gas)	:	The product is not flammable.
Upper explosion limit	:	not applicable

Lower explosion limit	:	not applicable
Vapour pressure	:	0,000312 hPa (25 °C)
Relative vapor density	:	not applicable
Relative density	:	0,813 (20 °C) (EU Method A.3)
Water solubility	:	108 g/l (25 °C)
Partition coefficient: n-octanol/water	:	log Kow -1,7 (23 °C) (OECD Test Guideline 107)
Ignition temperature	:	> 400 °C (1013 hPa) (EU Method A.16)
Thermal decomposition	:	> 160 °C
Viscosity, dynamic	:	not applicable
Explosivity	:	Currently we do not have any information from our supplier about this.
Oxidizing properties	:	none

9.2. Other information

No further information available.

10. Stability and reactivity

10.1. Reactivity

Advice : On contact with hot surfaces or flames this substance decomposes forming formic acid and carbon monoxide. The solution in water is a medium strong acid.

10.2. Chemical stability

Advice : No decomposition if stored and applied as directed.

10.3. Possibility of hazardous reactions

Hazardous reactions : Reacts violently with oxidizing agents. Reacts with some silver compounds to form explosive silver oxalate.
Attacks some forms of plastic.

10.4. Conditions to avoid

Conditions to avoid	:	Exposure to air.Exposure to moisture.
Thermal decomposition	:	>160 °C

10.5. Incompatible materials

Materials to avoid	:	Oxidizing agents, ammonia, Aqueous solution of alkali salts. Metals, Halogenates

10.6. Hazardous decomposition products

Hazardous decomposition products	:	Formic acid, Carbon monoxide, Carbon dioxide (CO2)

11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity
Oral
Harmful if swallowed. Risk for serious corrosive damage with severe pains, vomiting and possibly chock.
Inhalation
Inhalation of high concentration may cause mechanical overstraining of mucous membranes.
Dermal
Currently we do not have any information from our supplier about this.
Irritation
Skin

Harmful in contact with skin.

Eyes

Causes serious eye damage.

Sensitisation

Please find this information in the listing of the component/components below in the MSDS.

CMR effects

CMR Properties

Carcinogenicity	:	Please find this information in the listing of the component/components below in the MSDS.
Mutagenicity	:	Please find this information in the listing of the component/components below in the MSDS.
Teratogenicity	:	Please find this information in the listing of the component/components below in the MSDS.
Reproductive toxicity	:	Please find this information in the listing of the component/components below in the MSDS.

No human information is available.

Reproductive toxicity

No human information is available.

Specific Target Organ Toxicity

Single exposure

Currently we do not have any information from our supplier about this.

Repeated exposure

Currently we do not have any information from our supplier about this.

Aspiration toxicity

Currently we do not have any information from our supplier about this.

Component: oxalic acid dihydrate	**CAS-No. 6153-56-6**

Acute toxicity

Oral

LD50 Oral : 375 mg/kg (rat)

Dermal

LD50 Dermal : 20000 mg/kg (rabbit)

Irritation

Skin

No skin irritation (rabbit) (OECD Test Guideline 404)

Eyes

Risk of serious damage to eyes. (rabbit) (OECD Test Guideline 405)

Sensitisation

Does not cause skin sensitization. (OECD Test Guideline 429)

CMR effects

CMR Properties

Carcinogenicity : No experimental references for cancerogenity available.

Mutagenicity	:	Ames test: negative Did not show mutagenic effects on germ cells
Reproductive toxicity	:	Animal testing did not show any effects on fertility.

Other toxic properties
Repeated dose toxicity

LOAEL	:	150 mg/kg (Oral)

12. Ecological information

12.1. Toxicity

Component: oxalic acid dihydrate	**CAS-No. 6153-56-6**
Acute toxicity	
Fish	

LC50	:	160 mg/l (Freshwater fish; 96 h)

Toxicity to daphnia and other aquatic invertebrates

EC50	:	162,2 mg/l (Daphnia; 48 h) (OECD Test Guideline 202)

algae
80 mg/l (algae; 8 h) (Toxicity to algae)

12.2. Persistence and degradability

Component: oxalic acid dihydrate	**CAS-No. 6153-56-6**
Persistence and degradability	

Biodegradability	
Result	: Readily biodegradable

12.3. Bioaccumulative potential

Component: oxalic acid dihydrate	CAS-No. 6153-56-6
Bioaccumulation	
Result	: log Pow < 1 Bioaccumulation is not expected.

12.4. Mobility in soil

Component: oxalic acid dihydrate	CAS-No. 6153-56-6
Mobility	
	: Moderately mobile in soils

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	
Result	: Non-classified vPvB substance Non-classified PBT substance

12.6. Other adverse effects

13. Disposal considerations

13.1. Waste treatment methods

Product : Disposal regarding to the local and national legislation, Regulations for waste handling -Ur.l. RS št.84/1998 and

		Directive for waste handling Ur.l.RS 34/2008.
Contaminated packaging	:	Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. Packagings that cannot be cleaned are to be disposed of in the same manner as the product.
European Waste Catalogue Number	:	No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

14. Transport information

Not dangerous goods for ADR, RID and IMDG.

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

Not applicable.

14.4. Packaging group

Not applicable.

14.5. Environmental hazards

Not applicable.

14.6. Special precautions for user

Not applicable.

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

IMDG : Not applicable.

15. Regulatory information

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

Notification status

oxalic acid dihydrate:

Regulatory List	Notification	Notification number
AICS	YES	
INV (CN)	YES	
ENCS (JP)	YES	(2)-844
ISHL (JP)	YES	(2)-844
PICCS (PH)	YES	
NZIOC	YES	

15.2. Chemical Safety Assessment

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

16. Other information

Full text of R-phrases referred to under sections 2 and 3.

R21/22	Harmful in contact with skin and if swallowed.
R41	Risk of serious damage to eyes.

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H318	Causes serious eye damage.

Further information

Other information : The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text

|| Indicates updated section.

No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Industrial use - liquid	3	5, 6b, 6a, 8, 9, 10, 13, 14, 16, 17, 18, 19, 20, 23	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 15	1, 2, 3, 4, 5, 6a, 6b	NA	ES2421
2	Industrial use - solid	3	5, 6a, 6b, 8, 9, 10, 13, 14, 16, 17, 18, 19, 20, 23	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15, 21, 22	1, 2, 3, 4, 5, 6a, 6b	NA	ES2423
3	Professional use - liquid	22	NA	NA	10, 11, 15, 21	8a, 8b, 8c, 8d, 8e, 8f	NA	ES2425
4	Professional use - solid	22	NA	NA	10, 11, 15, 21	8a, 8b, 8c, 8d, 8e, 8f	NA	ES2427
5	Consumer use	21	NA	9a, 31, 35	NA	8a, 8b, 8c, 8d, 8e, 8f	NA	ES2437

1. Short title of Exposure Scenario 1: Industrial use - liquid	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU6a: Manufacture of wood and wood products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU14: Manufacture of basic metals, including alloys SU16: Manufacture of computer, electronic and optical products, electrical equipment SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU18: Manufacture of furniture SU19: Building and construction work SU20: Health services SU23: Electricity, steam, gas water supply and sewage treatment
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) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC15: Use as laboratory reagent
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids
2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b	

Amount used	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure	
Frequency and duration of use	Single exposure	< 12 Times per year:, Intermittent release
	Continuous exposure	Continuous release
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external recovery of waste	Recovery Methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	Aqueous solution
Amount used	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario	
Frequency and duration of use	Exposure duration per day	480 min
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to prevent /limit releases, dispersion and exposure	General occupational hygiene measures are required to ensure a safe handling of the substance Clean equipment and the work area every day.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable protective clothing. Wear protective shoes. Wear protective gloves/ eye protection/ face protection. Used working clothes should not be worn outside the work area.	
	Wear respiratory protection. (Efficiency: 90 %)(PROC7)	

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR

ERC1	---	Sewage treatment plant (STP)	---	---	0,024
ERC2	---	Sewage treatment plant (STP)	---	---	0,001
ERC3	---	Sewage treatment plant (STP)	---	---	0,08
ERC4	---	Sewage treatment plant (STP)	---	---	0,10
ERC5	---	Sewage treatment plant (STP)	---	---	0,10
ERC6a	---	Sewage treatment plant (STP)	---	---	0,016
ERC6b	---	Sewage treatment plant (STP)	---	---	0,01

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTP's, as emissions in the industrial stages mainly apply to (waste) water
The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect, The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water.
Significant emissions to air are not expected due to the very low vapour pressure of the substance.
Significant emissions to the terrestrial environment are not expected.
If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Bioaccumulation will not occur.

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Inhalation worker exposure	0,038mg/m³	0,002
PROC1	---	Dermal worker exposure	0,034mg/kg/day	0,009
PROC2	---	Inhalation worker exposure	0,375mg/m³	0,023
PROC2	---	Dermal worker exposure	0,137mg/kg/day	0,034
PROC3	---	Inhalation worker exposure	1,125mg/m³	0,070
PROC3	---	Dermal worker exposure	0,034mg/kg/day	0,009
PROC4	---	Inhalation worker exposure	1,876mg/m³	0,117
PROC4	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC5	---	Inhalation worker exposure	1,876mg/m³	0,117
PROC5	---	Dermal worker exposure	0,069mg/kg/day	0,017

PROC7	---	Inhalation worker exposure	1,876mg/m³	0,117
PROC7	---	Dermal worker exposure	2,143mg/kg/day	0,532
PROC8a	---	Inhalation worker exposure	3,751mg/m³	0,234
PROC8a	---	Dermal worker exposure	0,137mg/kg/day	0,034
PROC8b	---	Inhalation worker exposure	0,563mg/m³	0,035
PROC8b	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC9	---	Inhalation worker exposure	1,876mg/m³	0,117
PROC9	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC10	---	Inhalation worker exposure	3,751mg/m³	0,234
PROC10	---	Dermal worker exposure	1,371mg/kg/day	0,340
PROC13	---	Inhalation worker exposure	3,751mg/m³	0,234
PROC13	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC15	---	Inhalation worker exposure	1,876mg/m³	0,117
PROC15	---	Dermal worker exposure	0,034mg/kg/day	0,085

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

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.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

These measures involve good personal and housekeeping practices (i.e. regular cleaning), no eating and smoking at the workplace, wearing of standard working clothes and shoes

1. Short title of Exposure Scenario 2: Industrial use - solid	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6a: Manufacture of wood and wood products SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU14: Manufacture of basic metals, including alloys SU16: Manufacture of computer, electronic and optical products, electrical equipment SU17: General manufacturing, e.g. machinery, equipment, vehicles, other transport equipment SU18: Manufacture of furniture SU19: Building and construction work SU20: Health services SU23: Electricity, steam, gas water supply and sewage treatment
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) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/or articles PROC22: Potentially closed processing operations with minerals/metals at elevated temperature; industrial setting
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix

	ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b		
Amount used	The daily and annual amount/emission per site is not considered to be the main determinant for environmental exposure	
Frequency and duration of use	Single exposure	< 12 Times per year:, Intermittent release
	Continuous exposure	Continuous release
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimised. Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external recovery of waste	Recovery Methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC21, PROC22		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	solid
Amount used	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario	
Frequency and duration of use	Exposure duration per day	480 min
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to prevent /limit releases, dispersion and exposure	General occupational hygiene measures are required to ensure a safe handling of the substance Clean equipment and the work area every day.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable protective clothing. Wear protective shoes. Wear protective gloves/ eye protection/ face protection. Used working clothes should not be worn outside the work area.	

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Sewage treatment plant (STP)	---	---	0,024
ERC2	---	Sewage treatment plant (STP)	---	---	0,001
ERC3	---	Sewage treatment plant (STP)	---	---	0,0001
ERC4	---	Sewage treatment plant (STP)	---	---	0,10
ERC5	---	Sewage treatment plant (STP)	---	---	0,10
ERC6a	---	Sewage treatment plant (STP)	---	---	0,016
ERC6b	---	Sewage treatment plant (STP)	---	---	0,01

The environmental exposure assessment is only relevant for the aquatic environment, when applicable including STPs/WWTP's, as emissions in the industrial stages mainly apply to (waste) water
The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect, The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water.
Significant emissions to air are not expected due to the very low vapour pressure of the substance.
Significant emissions to the terrestrial environment are not expected.
If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Bioaccumulation will not occur.

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	---	Inhalation worker exposure	0,010mg/m³	0,001
PROC1	---	Dermal worker exposure	0,034mg/kg/day	0,009
PROC2	---	Inhalation worker exposure	0,100mg/m³	0,006
PROC2	---	Dermal worker exposure	0,137mg/kg/day	0,034
PROC3	---	Inhalation worker exposure	0,100mg/m³	0,006
PROC3	---	Dermal worker exposure	0,034mg/kg/day	0,009

PROC4	---	Inhalation worker exposure	2,5mg/m³	0,156
PROC4	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC5	---	Inhalation worker exposure	2,5mg/m³	0,156
PROC5	---	Dermal worker exposure	0,069mg/kg/day	0,017
PROC7	---	Inhalation worker exposure	5mg/m³	0,312
PROC7	---	Dermal worker exposure	2,143mg/kg/day	0,532
PROC8a	---	Inhalation worker exposure	5mg/m³	0,312
PROC8a	---	Dermal worker exposure	0,137mg/kg/day	0,034
PROC8b	---	Inhalation worker exposure	1,250mg/m³	0,078
PROC8b	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC9	---	Inhalation worker exposure	2mg/m³	0,125
PROC9	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC10	---	Inhalation worker exposure	1,000mg/m³	0,062
PROC10	---	Dermal worker exposure	1,371mg/kg/day	0,340
PROC13	---	Inhalation worker exposure	0,500mg/m³	0,031
PROC13	---	Dermal worker exposure	0,686mg/kg/day	0,170
PROC14	---	Inhalation worker exposure	1,000mg/m³	0,062
PROC14	---	Dermal worker exposure	0,343mg/kg/day	0,085
PROC15	---	Inhalation worker exposure	0,500mg/m³	0,031
PROC15	---	Dermal worker exposure	0,034mg/kg/day	0,009
PROC21	---	Inhalation worker exposure	1,000mg/m³	0,062
PROC21	---	Dermal worker exposure	0,283mg/kg/day	0,070
PROC22	---	Inhalation worker exposure	0,100mg/m³	0,006
PROC22	---	Dermal worker exposure	0,849mg/kg/day	0,211

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

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.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management

Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

These measures involve good personal and housekeeping practices (i.e. regular cleaning), no eating and smoking at the workplace, wearing of standard working clothes and shoes

1. Short title of Exposure Scenario 3: Professional use - liquid		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC10: Roller application or brushing PROC11: Non industrial spraying PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/or articles	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f		
Amount used	Daily amount per site	1000 kg
Frequency and duration of use	Single exposure	< 12 Times per year:, Intermittent release
	Continuous exposure	Continuous release
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Do not allow product to reach sewage system
	Disposal methods	Wastes must not be disposed together with household garbage
2.2 Contributing scenario controlling worker exposure for: PROC10, PROC11, PROC15, PROC21		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	Aqueous solution
Amount used	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario	
Frequency and duration of use	Exposure duration per day	480 min
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to	General occupational hygiene measures are required to ensure a safe handling	

prevent /limit releases, dispersion and exposure	of the substance Clean equipment and the work area every day.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable protective clothing. Wear protective shoes. Wear protective gloves/ eye protection/ face protection. Used working clothes should not be worn outside the work area.
	Wear respiratory protection. (Efficiency: 90 %)(PROC10, PROC11)

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	---	---	0,179
ERC8b	---	Fresh water	---	---	0,013
ERC8c	---	Fresh water	---	---	0,011
ERC8d	---	Fresh water	---	---	0,179
ERC8e	---	Fresh water	---	---	0,013
ERC8f	---	Fresh water	---	---	0,011

The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water.
Significant emissions to air are not expected due to the very low vapour pressure of the substance.
Significant emissions to the terrestrial environment are not expected.
If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Bioaccumulation will not occur.

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC10	---	Inhalation worker exposure	1,876mg/m³	0,117
PROC10	---	Dermal worker exposure	1,371mg/kg/day	0,340
PROC11	---	Inhalation worker exposure	7,503mg/m³	0,468
PROC11	---	Dermal worker exposure	2,143mg/kg/day	0,532
PROC15	---	Inhalation worker exposure	3,751mg/m³	0,234
PROC15	---	Dermal worker exposure	0,034mg/kg/day	0,009
PROC21	---	Dermal worker exposure	0,283mg/kg/day	0,070

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

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.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

These measures involve good personal and housekeeping practices (i.e. regular cleaning), no eating and smoking at the workplace, wearing of standard working clothes and shoes

1. Short title of Exposure Scenario 4: Professional use - solid		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Process categories	PROC10: Roller application or brushing PROC11: Non industrial spraying PROC15: Use as laboratory reagent PROC21: Low energy manipulation of substances bound in materials and/or articles	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f		
Amount used	Daily amount per site	1000 kg
Frequency and duration of use	Single exposure	< 12 Times per year:, Intermittent release
	Continuous exposure	Continuous release
Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
2.2 Contributing scenario controlling worker exposure for: PROC10, PROC11, PROC15, PROC21		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	solid
Amount used	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario	
Frequency and duration of use	Exposure duration per day	480 min
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to prevent /limit releases, dispersion and exposure	General occupational hygiene measures are required to ensure a safe handling of the substance Clean equipment and the work area every day.	
Conditions and measures related	Wear suitable protective clothing.	

to personal protection, hygiene and health evaluation	Wear protective shoes. Wear protective gloves/ eye protection/ face protection. Used working clothes should not be worn outside the work area.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a	---	Fresh water	---	---	0,179
ERC8b	---	Fresh water	---	---	0,013
ERC8c	---	Fresh water	---	---	0,011
ERC8d	---	Fresh water	---	---	0,179
ERC8e	---	Fresh water	---	---	0,013
ERC8f	---	Fresh water	---	---	0,011

The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water.
Significant emissions to air are not expected due to the very low vapour pressure of the substance.
Significant emissions to the terrestrial environment are not expected.
If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Bioaccumulation will not occur.

Workers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC10	---	Inhalation worker exposure	0,100mg/m³	0,006
PROC10	---	Dermal worker exposure	1,371mg/kg/day	0,340
PROC11	---	Inhalation worker exposure	0,200mg/m³	0,012
PROC11	---	Dermal worker exposure	2,143mg/kg/day	0,532
PROC15	---	Inhalation worker exposure	0,020mg/m³	0,001
PROC15	---	Dermal worker exposure	0,034mg/kg/day	0,009
PROC21	---	Inhalation worker exposure	0,600mg/m³	0,037
PROC21	---	Dermal worker exposure	0,283mg/kg/day	0,070

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

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.

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

These measures involve good personal and housekeeping practices (i.e. regular cleaning), no eating and smoking at the workplace, wearing of standard working clothes and shoes

1. Short title of Exposure Scenario 5: Consumer use	
Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC9a: Coatings and paints, thinners, paint removers PC31: Polishes and wax blends PC35: Washing and cleaning products (including solvent based products)
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC8e: Wide dispersive outdoor use of reactive substances in open systems ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8c, ERC8d, ERC8e, ERC8f		
Amount used	Daily amount per site	10 g/day
Frequency and duration of use	Single exposure	< 12 Times per year:, Intermittent release

2.2 Contributing scenario controlling consumer exposure for: PC9a, PC31, PC35		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 5 %.
Amount used	Amount used per event	10 g
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	not required

3. Exposure estimation and reference to its source

Environment

The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water.
Significant emissions to air are not expected due to the very low vapour pressure of the substance.
Significant emissions to the terrestrial environment are not expected.
The sediment compartment is not considered, because it is not relevant for the substance., If emitted to the aquatic compartment, sorption to sediment particles will be negligible.
Bioaccumulation will not occur.

Consumers

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC9a, PC31, PC35	---	Consumer inhalation exposure	0,02mg/m³	0,018
PC9a, PC31,	---	Consumer dermal	0,238mg/kg/day	0,20

PC35		exposure		

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

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.
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
For scaling see: http://www.ecetoc.org/tra
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Take care for general good hygiene and housekeeping.