Material Safety Data Sheet
according to Regulation (EC) 1907/2006 - 453/2010

Product name :	ACID OXALIC		
Code:	ACI140000025		
Revision :	15.06.2012	**Version :**	3.0.0
Print date :	15/06/2012	**Previous Version :**	2.0.0

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

1.1 Product identifier

ACID OXALIC (ACI140000025; ACI140000625; T059002-MK)

OXALIC ACID DIHYDRATED ; Registration number (EC) : 01-2119534576-33 ; CAS-No. : 6153-56-6 ; EC-No. : 205-634-3 ; Index-No. : 607-006-00-8

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

Industrial use - liquid
Industrial use - solid
Professional use - liquid
Professional use - solid
Consumer use

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier :	Brenntag
Street/P.O.Box :	Via Cusago 150/4
Country code/Postal code/Town/City :	20153 Milano
Telephone :	+39 02 48333 0
Telefax :	+39 02 48333 201
Contact :	infoSDS@brenntag.it

1.4 Emergency telephone number

Centro Antiveleni di Milano 02 66101029 (CAV Ospedale Niguarda Ca' Granda -Milano)
Centro Antiveleni di Pavia 0382 24444 (CAV IRCCS Fondazione Maugeri - Pavia)
Centro Antiveleni di Bergamo 800 883300 (CAV Ospedali Riuniti - Bergamo)
Centro Antiveleni di Firenze 055 7947819 (CAV Ospedale Careggi - Firenze)
Centro Antiveleni di Roma 06 3054343 (CAV Policlinico Gemelli - Roma)
Centro Antiveleni di Roma 06 49978000 (CAV Policlinico Umberto I - Roma)
Centro Antiveleni di Napoli 081 7472870 (CAV Ospedale Cardarelli - Napoli)

2. Hazards identification

2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008 (CLP)

Causes serious eye damage. · Harmful if swallowed. · Harmful in contact with skin.
Acute Tox. 4 ; H312 · Acute Tox. 4 ; H302 · Eye Dam. 1 ; H318

Directive 67/548/EEC or 1999/45/EC

Risk of serious damage to eyes. · Harmful in contact with skin and if swallowed.
Xi ; R 41 · Xn ; R 21/22

2.2 Label elements

Regulation (EC) No 1272/2008 (CLP)

Hazard pictograms

Corrosion (GHS05) · Exclamation mark (GHS07)

Signal word

Warning

Hazard statements

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

Precautionary statements

P264	Wash the hands thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301/312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P305/351/338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P302/352	IF ON SKIN: Wash with plenty of soap and water.
P501	Dispose of contents/container to ...

2.3 Other hazards

None.

3. Composition/information on ingredients

3.1 Substances

Chemical characterization

OXALIC ACID DIHYDRATED ; Registration number (EC) : 01-2119534576-33 ; CAS-No. : 6153-56-6 ; EC-No. : 205-634-3 ; Index-No. : 607-006-00-8

4. First aid measures

4.1 Description of first aid measures

General

In all cases of doubt, or when symptoms persist, seek medical attention.

After inhalation

Remove from the danger zone, move to a ventilated place; if symptoms of malaise appear seek medical assistance.

After skin contact

Immediately remove contaminated clothing. Wash immediately with plenty of running water all skin portions that have been contaminated, even if only suspected.

After eye contact

Wash immediately with plenty of running water for at least 10 - 15 min, while keeping the eyelids wide open. GET MEDICAL ATTENTION IMMEDIATELY.

After ingestion

Absolutely don't induce vomit, call a physician and show the material data sheet. Never give anything by mouth to an unconscious person. Call a physician.

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

None.

5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

Unsuitable extinguishing media
Water jet.

5.2 Special hazards arising from the substance or mixture
Carbon monoxide.

5.3 Advice for firefighters
In case of fire do not breathe fumes Appropriate breathing apparatus may be required.

5.4 Additional information
Keep away unauthorized people from danger area.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear protection gloves, clothes, glasses, boots and respiratory apparatus. Refer to protective measures listed in sections 7 and 8.

6.2 Environmental precautions
Do not empty into drains. If the product contaminates lakes, rivers or sewages, inform appropriate authorities in accordance with local regulations.

6.3 Methods and material for containment and cleaning up
In case of solid product, avoid the dust release. In case of liquid product, limit and adsorb the spill with inert adsorbing material (for example sand, vermiculite). Put the resultant material in adeguate packiaging and send to an authorized plant for the disposal. Collect the spread product, and then wash with water area and materials. Recove the water used and send to an authorized plant for the disposal.

6.4 Reference to other sections
None.

6.5 Additional information
Keep away form the dangerous area not authorized people.

7. Handling and storage

For transportation, storage and handling use only proper materials.

7.1 Precautions for safe handling
Information for safe handling
Use with good manufacturing practice and with correct protection devices Don't eat, drink or smoke on the production place. Use precautions in the proiduct use. Avoid the contact and vapours and/or dust inhalation. See the MSDS paragraph 8.

7.2 Conditions for safe storage, including any incompatibilities
Requirements to be met by storerooms and containers
Store in a cool, dry place. Avoid exposure to direct sunlight. Make sure that ventilation is adequate.

Information about separation of incompatible products
Keep away from materials which can lead to reaction. See par. 10. Store the foodstuffs separately.

Further information about storage conditions
Storage class : 13

7.3 Specific end use(s)
None.

8. Exposure controls/personal protection

8.1 Control parameters
OXALIC ACID DIHYDRATED ; CAS-No. : 6153-56-6

Specification :	DNEL (EC)
Parameter :	Systemic effects_Long-term_ Oral_Population
Value :	1,14 mg/kg
Version date :	
Specification :	DNEL (EC)
Parameter :	Local effects_Short-term_dermal_Work
Value :	0,69 mg/cm2
Version date :	
Specification :	DNEL (EC)
Parameter :	Systemic effects_Long-term_Dermal _Workers
Value :	2,29 mg/kg
Version date :	
Specification :	DNEL (EC)
Parameter :	Systemic effects_Long-term_Inhalation_Workers
Value :	4,03 mg/m^3
Version date :	
Specification :	DNEL (EC)
Parameter :	Local effects_Short-term_Dermal_Work
Value :	0,35 mg/cm2
Version date :	
Specification :	DNEL (EC)
Parameter :	Systemic effects_Long-term_Dermal_Population
Value :	1,14 mg/kg
Version date :	
Specification :	PNEC (EC)
Parameter :	Freshwater
Value :	0,1622 mg/l
Version date :	
Specification :	PNEC (EC)
Parameter :	Marine water
Value :	0,1622 mg/l
Version date :	
Specification :	PNEC (EC)
Parameter :	Intermittent releases
Value :	1,622 mg/l
Version date :	
Specification :	PNEC (EC)
Parameter :	Sewage Treatment Plants
Value :	1550 mg/l
Version date :	
Specification :	TLV/STEL (EC)
Value :	2 mg/m^3
Version date :	
Specification :	TLV/TWA (EC)
Value :	1 mg/m^3
Version date :	

8.2 Exposure controls

Personal protective equipment

Preview eyes rinse apparatus and emergency shower.

General protective and hygiene measures

Do not eat or drink during work - no smoking.

Respiratory protection
Use respiratory protective equipment in case of insufficient ventilation or prolonged exposure.
Filter ABEK/P3.

Hand protection
Use protective gloves.

Eye protection
Use tightly fitting safety glasses.

Body protection
Personel should wear protective clothings and all parts of the body should be washed after contact. Care should be taken in the selection of protective clothing to ensure that inflammation and irritation of the skin at neck and wrists through contact with the powder is avoided.

Additional information about engineering measures
Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and solvent vapour below the OEL (=Occupational Exposure Limit) , suitable respiratory protection must be worn.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Relevant safety data

Aspect			Powder / granular	
Colour			colourless	
Odour			none	
Melting point / melting range :	(1013 hPa)	>	160	°C
Vapour density	(air=1)		Data not available	
Boiling temperature / boiling range:	(1013 hPa)		not applicable	
Decomposition temperature :		>	160	°C
Self flammability		>	400	°C
Flash point :			not applicable	
Flammability (solid, gas)			Not flammable	
Lower explosion limit :			No data available	
Upper explosion limit :			No data available	
Explosive properties			Product is not explosive	
Vapour pressure	(20 °C)		negligible	
Density :	(20 °C)	=	0,813	g/cm^3
Soluble in:			ethanol	
Solubility in water :	(25 °C)	ca.	108	g/l
pH value :		ca.	1	
Log Pow	(20 °C)	=	-1,7	
Viscosity :	(20 °C)		not applicable	
Odour threshold			Data not available	
Evaporation rate			Data not available	
Sublimation point		ca.	160	°C
Oxidizing properties			Not oxidising	

9.2 Other information
None.

10. Stability and reactivity

10.1 Reactivity
Reaction with oxidizing agents possible. Reacts with reducing agents.

10.2 Chemical stability
Stable under recommended storage and handling conditions(See section 7).

10.3 Possibility of hazardous reactions
There are no data available on the product itself.

10.4 Conditions to avoid
Avoid heat influence.

10.5 Incompatible materials
Oxidizing agents. Ammonia (NH3) Metals. Alkaline substances.

10.6 Hazardous decomposition products
Possible formation of carbon oxides. Formic acid.

11. Toxicological information

Corrosive product: eyes and skin extremely irritant: can cause serious damages

11.1 Information on toxicological effects

LD50/LC50 values that are relevant for classification

Specification :	LD50 (OXALIC ACID DIHYDRATED ; CAS-No. : 6153-56-6)
Routes of entry :	Oral
Test species :	Rat (female)
Value / dosage :	= 375 mg/kg
Specification :	LD50 (OXALIC ACID DIHYDRATED ; CAS-No. : 6153-56-6)
Routes of entry :	Dermal
Test species :	Rabbit
Value / dosage :	= 20000 mg/kg

Primary irritant effect

On the skin: no irritant effect.
Risk of serious damage to eyes.

Sensitization

Did not cause sensitization.

Cancerogenic and mutagenic effects, risks to reproduction

Ames Test: negative.
Mammalian chromosome aberration test: Negative.

12. Ecological information

Use with good manufacturing practice. Avoid the release in the environment

12.1 Toxicity

Aquatic toxicity

Specification :	EC50 (OXALIC ACID DIHYDRATED ; CAS-No. : 6153-56-6)
Parameters :	Daphnia Daphnia magna
Value / dosage :	= 136,9 mg/l
Test-period :	48 h
Specification :	LC50 (OXALIC ACID DIHYDRATED ; CAS-No. : 6153-56-6)

Parameters :	Fish Leuciscus idus melanotus
Value / dosage :	= 325 mg/l
Test-period :	48 h
Specification :	LD50 (OXALIC ACID DIHYDRATED ; CAS-No. : 6153-56-6)
Parameters :	Algae microcystis aeruginosa
Value / dosage :	= 80 mg/l
Test-period :	8 days

12.2 Persistence and degradability

Biological degradiation / elimination

Readily biodegradable

12.3 Bioaccumulative potential

There are no data available on the product itself.

12.4 Mobility in soil

There are no data available on the product itself.

12.5 Results of PBT and vPvB assessment

This product is none, or does not contain a substance called a PBT or vPvB

12.6 Other adverse effects

There are no data available on the product itself.

13. Disposal considerations

13.1 Waste treatment methods

Recommendation

Pass on to an appropriate incinerating plant or depository or recycling.

Contaminated packaging

Recommendation

Contaminated packaging must be emptied of all residues and, following appropriate cleaning, may be sent to a recycling plant.
Uncleaned packaging must be disposed of in the same manner as the medium.

14. Transport information

14.1 UN number

The product does not constitute a hazardous substance in national / international road, rail, sea and air transport.

14.2 UN proper shipping name

The product does not constitute a hazardous substance in national / international road, rail, sea and air transport.

14.3 Transport hazard class(es)

The product does not constitute a hazardous substance in national / international road, rail, sea and air transport.

14.4 Packing group

The product does not constitute a hazardous substance in national / international road, rail, sea and air transport.

14.5 Environmental hazards

The product does not constitute a hazardous substance in national / international road, rail, sea and air transport.

14.6 Special precautions for user

None.

15. Regulatory information

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

National regulatory information

Italy: Legislative Decree 81/2008 (Consolidated Law on protection of health and safety at work), as amended and Directive 2009/161/UE - chemical risk assessment in accordance with Title IX

Emission control act ("TA-Luft")

Weight fraction (Number 5.2.5. I) : 95 - 100 %

Water pollution classification

Class : 1 Classification according to VwVwS

International regulatory information

Directive 67/548/CEE (Dangerous substances classification, labelling and packaging) and subsequent amendements.
Directive 1999/45/CE (Dangerous peparations classification, labelling and packaging) and subsequent amendements.
Regulation n°. 1907/2006/CE (REACh).
Regulation n°. 1272/2008/CE (CLP).
Regulation n°. 790/2009/CE (ramending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008)

15.2 Chemical safety assessment

There are no data available on the product itself.

16. Other information

Further information

We have no knowledge or control over the user´s working conditions however. The user is responsible for the observance of all required statutory provisions.

LEGENDA:

ADN:	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN)
ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road
ASTM:	American Society for Testing and Materials (ASTM)
EINECS:	European Inventory of Existing Commercial Chemical Substances
EC50:	Effective Concentration 50
LC50:	Lethal Concentration 50
IC50:	Inhibitor Concentration 50
NOEL:	No Observed Effect Level
DNEL:	Derived No Effect Level
DMEL:	Derived Minimum Effect Level
CLP:	Classification, Labelling and Packaging
CSR:	Chemical Safety Report
LD50:	Lethal Dose 50
IATA:	International Air Transport Association
ICAO:	International Civil Aviation Organization
Codice IMDG:	International Maritime Dangerous Goods code
PBT:	Persistent, bioaccumulative and toxic
RID:	European Agreement concerning the International Carriage of Dangerous Goods by Rail
STEL:	Short term exposure limit
TLV:	Threshold limit value
TWA:	Time Weighted Average
UE:	European Uniopn
vPvB:	Very persistent very bioaccumulative
N.D.:	Not available

N.A.: Not applicable

VwVwS.: Text of Administrative Regulation on the Classification of Substances hazardous to waters into Water Hazard Classes (Verwaltungsvorschrift wassergefährdende Stoffe – VwVwS)

R-Phrases of components

21/22	Harmful in contact with skin and if swallowed.
41	Risk of serious damage to eyes.

GHS Hazard statements of components

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

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	Do not blow dust off with compressed air 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	Do not blow dust off with compressed air 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	1.000 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	Do not blow dust off with compressed air 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 %)(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	1.000 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	Do not blow dust off with compressed air	

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
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, PC35	---	Consumer dermal exposure	0,238mg/kg/day	0,20

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.