

Extended Safety data sheet

According to COMMISSION REGULATION (EU) No 453/2010

Printing date 19-08-2013

Revision: 2.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking**· 1.1 Product identifier**

- **Trade name:** itaconic acid
- **CAS Number:**
97-65-4
- **EC number:**
202-599-6
- **Registration number:** 01-2119883794-19-0001

· 1.2 Relevant identified uses of the substance or mixture

1. Formulation and repacking
2. Used in synthesis/ used as intermediates
3. Polymer production

· 1.3 Details of the supplier of the safety data sheet

Supplier(Only representative): Chemical Inspection & Regulation Service Limited
 Supplier(Manufacturer): Zhejiang Guoguang Biochemistry Co., Ltd.
 Address: A-30 plot, High-tech Park Quzhou City, Zhejiang, China
 Contact person(E-mail): JALLY JIA hzzxhj@vip.sina.com, hzzxhjy@163.com
 Telephone: +86-570-8610536
 Fax: +86-570-2367568

1.4 Emergency telephone number

+353 41 980 6916

Available outside office hours? NO

SECTION 2: Hazards identification**· 2.1 Classification of the substance or mixture****· Classification according to Regulation (EC) No 1272/2008**

Irreversible effects on the eye (Category 1)
 Eye Dam. 1 H318 Causes serious eye damage.

· Classification according to Directive 67/548/EEC or Directive 1999/45/EC

Xi; R41: Risk of serious damage to eyes.

· 2.2 Label elements**· Labelling according to Regulation (EC) No 1272/2008:**

The substance is classified and labelled according to the CLP regulation.

· Hazard pictograms

GHS05

· Signal word: Danger**· Hazard statements:**

H318 Causes serious eye damage.

· Precautionary statements:

P280 Wear protective gloves/protective clothing/eye protection/face protection.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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P310 Immediately call a POISON CENTER or doctor/physician.

- **2.3 Other hazards:**
- **Results of PBT and vPvB assessment**
- **PBT:** Not PBT
- **vPvB:** Not vPvB

SECTION 3: Composition/information on ingredients

- **3.1 Chemical characterization (Substances)**
- **CAS No. Description**
97-65-4 itaconic acid
- **Identification number(s)**
- **EC number:** 202-599-6

SECTION 4: First aid measures

- **4.1 Description of first aid measures**
- **General information:**
 - As a general rule, in case of doubt or if symptoms persist, always call a doctor.
 - NEVER induce swallowing in an unconscious person.
- **After inhalation:**
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
If the contaminated area is widespread and/or there is damage to the skin, a doctor must be consulted or the patient transferred to hospital
- **After eye contact:**
Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:**
Seek immediate medical advice.
Rinse the mouth with water
- **Information for doctor:** Emergency phone: see section 1.
- **4.2 Most important symptoms and effects, both acute and delayed**
No further relevant information available.
- **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents:**
CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **5.2 Special hazards arising from the substance or mixture**
Generally,
 - Non-flammable.
 - Keep packages near the fire cool, to prevent pressurised containers from bursting.
 But in case of dust, it may be moderately flammable.
 - A fire will often produce a thick black smoke. Exposure to decomposition products may be hazardous to health.
 - Do not breathe in smoke.
 - In the event of a fire, the following may be formed:

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- carbon monoxide (CO)
- carbon dioxide (CO₂)

- **5.3 Advice for firefighters**

Due to the toxicity of the gas emitted on thermal decomposition of the products, fire-fighting personnel are to be equipped with autonomous insulating breathing apparatus.

- **Protective equipment:** Mouth respiratory protective device.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**

For non fire-fighters

- Avoid any contact with the skin and eyes.
- Avoid inhaling dust.
- If a large quantity has been spilt, evacuate all personnel and only allow intervention by trained operators equipped with safety apparatus.

For fire-fighters

- Fire-fighters will be equipped with suitable personal protective equipment (See section 8).

- **6.2 Environmental precautions**

Prevent any material from entering drains or waterways.

Do not allow to enter sewers/ surface or ground water.

- **6.3 Methods and material for containment and cleaning up**

Retrieve the product by mechanical means (sweeping/vacuuming): do not generate dust.

- **6.4 Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling**

- Always wash hands after handling.
- Remove and wash contaminated clothing before re-using.

- **Information about fire - and explosion protection:**

Fire prevention:

- Handle in well-ventilated areas.
- Prevent access by unauthorised personnel.

Recommended equipment and procedures:

- For personal protection, see section 8.-
- Observe precautions stated on label and also industrial safety regulations
- Avoid inhaling dust.
- Also provide breathing apparatus for certain short tasks of an exceptional nature and for emergency interventions
- In all cases, recover emissions at source
- Avoid skin and eye contact with this substance.

Prohibited equipment and procedures:

- No smoking, eating or drinking in areas where the substance is used.

- **7.2 Conditions for safe storage, including any incompatibilities**

- **Requirements to be met by storerooms and receptacles:**

Keep the container tightly closed in a dry, well-ventilated place.

Always keep in packaging made of an identical material to the original.

- **Information about storage in one common storage facility:** Not required.

- **Further information about storage conditions:** None.

- **7.3 Specific end use(s)** No further relevant information available.

Trade name: itaconic acid

SECTION 8: Exposure controls/personal protection

· **8.1 Control parameters**

· ***Ingredients with limit values that require monitoring at the workplace:*** Not required.

· ***DNELs***

For worker:

DNEL (Long-term – inhalation, systemic effects): 22.05 mg/m³

DNEL (Long-term – dermal, systemic effects): 25 mg/kg bw/day

For general population:

DNEL (Long-term – inhalation, systemic effects): 11.03 mg/m³

DNEL (Long-term – oral, systemic effects): 12.5 mg/kg bw/day

· ***PNECs***

PNEC aqua (freshwater): 0.0622 mg/L

PNEC aqua (marine water): 0.00622 mg/L

PNEC aqua (intermittent releases): 0.622 mg/L

PNEC soil: 0.00883mg/kg soil dw

PNEC STP: 2.17 mg/L

· **8.2 Exposure controls**

· ***Personal protective equipment:***

· ***General protective and hygienic measures:***

Do not eat, drink, smoke or sniff while working.

Store protective clothing separately.

Use personal protective equipment that is clean and has been properly maintained.

· ***Respiratory protection:***

Use suitable respiratory protective device in case of insufficient ventilation.

- Avoid breathing dust.

- When workers are confronted with concentrations that are above occupational exposure limits, they must wear a suitable, approved, respiratory protection device.

- Type of FFP mask:

- Wear a disposable half-mask dust filter in accordance with standard EN149.

- Category:

- FFP1

- Anti-gas and vapour filter(s) (Combined filters) in accordance with standard EN14387:

- A1 (Brown)

· ***Protection of hands:***



Protective gloves

- Protective creams may be used for exposed skin, but they should not be applied after contact with the product.

- Wear suitable protective gloves in the event of prolonged or repeated skin contact.

- Use suitable protective gloves that are resistant to chemical agents in accordance with standard EN374.

- Gloves must be selected according to the application and duration of use at the workstation.

- Protective gloves need to be selected according to their suitability for the workstation in question: other chemical products that may be handled, necessary physical protections (cutting, pricking, heat protection), level of dexterity required.

- Recommended properties:

- Impervious gloves in accordance with standard EN374

· ***Material of gloves:***

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer

· ***Penetration time of glove material:***

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Trade name: itaconic acid**· Eye protection:**

Tightly sealed goggles

- Avoid contact with eyes.
- Before handling powders or dust emission, wear mask goggles in accordance with standard EN166.
- Prescription glasses are not considered as protection.
- Provide eyewash stations in facilities where the product is handled constantly.

· Body protection:

Protective work clothing

- Avoid skin contact.
- These clothes shall be chosen to ensure there is no inflammation or irritation of the skin at the neck and wrist by contact with the powder
- Suitable type of protective clothing:
 - Wear protective clothing against solid chemicals and particles suspended in the air (type 5) in accordance with standard EN13982-1 to prevent skin contact.
- Work clothing worn by personnel shall be laundered regularly.
- After contact with the product, all parts of the body that have been soiled must be washed.

SECTION 9: Physical and chemical properties**· 9.1 Information on basic physical and chemical properties****· General Information****· Appearance:**

Form: Crystalline (Particle size >75µm)

Colour: White

· Odour: Undetermined

· Odour threshold: Not determined.

· pH-value (0,08 g/l) at 20°C: 2

· Change in condition

Melting point/Melting range: 163,0-168,4°C

Boiling point/Boiling range: Undetermined.

· Flash point: Not applicable.

· Flammability (solid, gaseous): Product is not flammable.

· Ignition temperature:

Decomposition temperature: Not determined.

· Self-igniting: Not determined.

· Danger of explosion: Product does not present an explosion hazard.

· Explosion limits:

Lower: Not determined.

Upper: Not determined.

· Vapour pressure at 20°C: 1,15E-7 hPa

· Density at 20°C: 0,893 g/cm³

· Relative density Not determined.

· Vapour density Not applicable.

· Evaporation rate Not applicable.

· Solubility in / Miscibility with water at 20°C:	77,49 g/l
· Partition coefficient (n-octanol/water):	-0.301 Log Pow
· Viscosity:	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· <u>9.2 Other information</u>	No further relevant information available.

SECTION 10: Stability and reactivity

- **10.1 Reactivity** See section 10.5
- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
- **10.3 Possibility of hazardous reactions** No dangerous reactions known.
- **10.4 Conditions to avoid**
 - Avoid formation of dusts
 - Dusts can form an explosive mixture with air.
- **10.5 Incompatible materials**
 - Oxidising agents
 - Reducing agents
 - Bases
- **10.6 Hazardous decomposition products** Carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity:**

Oral	LD50	2969 mg/kg (rat) (EU Method B.1 (Acute Toxicity (Oral)))
Dermal	LD0	> 2000 mg/kg bw (rat) (EU Method B.3 (Acute Toxicity (Dermal)))
- **Skin corrosion/irritation**
Not irritating Rabbit, EU Method B.4 (Acute Toxicity: Dermal Irritation / Corrosion)
- **Serious eye damage/irritation**
Highly irritating Rabbit, EU Method B.5 (Acute Toxicity: Eye Irritation / Corrosion)
- **Respiratory or skin sensitization**
Not sensitizing Guinea pig, EU Method B.6 (Skin Sensitisation)
- **Germ cell mutagenicity**
Negative
In vitro S. typhimurium, OECD Guideline 471 (Bacterial Reverse Mutation Assay)
In vivo Mouse, EU Method B.12 (Mutagenicity - In Vivo Mammalian Erythrocyte Micronucleus Test)
- **Carcinogenicity**
Based on available data, the classification criteria are not met.
- **Reproductive toxicity**
Effects on fertility: No data available

Developmental toxicity:

Oral NOAEL (maternal toxicity) 1000 mg/kg bw/day (rat)
 NOAEL (fetotoxicity) 1000 mg/kg bw/day (rat)
 (OECD Guideline 415 (one- or two- (or multi-) generation studies))

· **Repeated dose toxicity**

Oral NOAEL 1001 mg/kg bw/day (rat) (OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity in Rodents))

· **STOT-single exposure**

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

· **STOT- repeated exposure**

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

· **Aspiration hazard**

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

SECTION 12: Ecological information

· **12.1 Toxicity**

· **Acquatic toxicity:**

Freshwater

LC50 (24h): 190 mg/L (Salmo gairdneri (new name: Oncorhynchus mykiss)) (EU Method C.1 (Acute Toxicity for Fish))

EC50 (24 h): 240 mg/L (Daphnia magna) (EU Method C.2 (Acute Toxicity for Daphnia))

ErC50 (96 h): 6.22 mg/L (Algae, estimated, based on: growth rate) (QSAR)

Long-term toxicity aquatic toxicity: Study scientifically unjustified (column 2 of REACH Annex IX)

Sediment organisms: Study scientifically unjustified (Log Kow < 3)

Activated sludge respiration inhibition testing:

NOEC 21.7 mg/L (tested concentration in ready biodegradability test) (column 2 of REACH Annex VIII)

Effects on terrestrial organisms: Equilibrium partitioning method applied

Toxicity to birds: Study scientifically unjustified (no potential for bioaccumulation)

· **12.2 Persistence and degradability**

Ready biodegradable

% Degradation of test substance (Test method: OECD Guideline 301 B (Ready Biodegradability: CO2 Evolution Test)):

90.9% after 10 d (CO2 evolution)

100% after 18 d (CO2 evolution)

· **12.3 Bioaccumulative potential**

Due to the distribution coefficient n-octanol/water a worth-mentioning accumulation in organisms is not expected.

· **12.4 Mobility in soil** No further relevant information available.

· **12.5 Results of PBT and vPvB assessment**

· **PBT:** Not PBT

· **vPvB:** Not vPvB

· **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations· **13.1 Waste treatment methods**· **Recommendation:**

Must not be disposed together with household garbage. Do not allow product to reach sewage system.

- Waste management is carried out without endangering human health, without harming the environment and, in particular without risk to water, air, soil, plants or animals.
- Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector or company.
- Do not contaminate the ground or water with waste; do not dispose of waste into the environment.

· **Uncleaned packaging**· **Recommendation:**

Disposal must be made according to official regulations.

- Empty container completely. Keep label(s) on container.
- Give to a certified disposal contractor.

· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information· **14.1 UN number**

Not applicable.

· **14.2 UN proper shipping name**

Not applicable.

· **14.3 Transport hazard class(es)**

Exempt from transport classification and labelling.

· **14.4 Packing 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 MARPOL73/78 and the IBC Code**

Not applicable.

SECTION 15: Regulatory information· **15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

- Particular provisions: No data available
- German regulations concerning the classification of hazards for water (WGK):
Germany: WGK 1 (VwVwS vom 27/07/2005, KBws)

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Abbreviations and acronyms:**

GHS: Globally Harmonized System of Classification and Labelling of Chemicals EINECS: European Inventory of Existing Commercial Chemical Substances CAS: Chemical Abstracts Service (division of the American Chemical Society DNEL: Derived No-Effect Level (REACH)

PNEC: Predicted No-Effect Concentration (REACH) LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

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EC50 : Effect concentration, 50 percent
ErC50 : Acute growth rate EC50
NOEC : No Observed Effect Concentration
NOAEL : No Observed Adverse Effect Level

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ANNEX TO THE SDS

Appendix 1 – Exposure scenarios

1 Exposure Scenario (1): Formulation and repacking		
List of all use descriptors related to the life cycle stage and all the uses under it		
SU 10, PROC 3,5,8a,8b,9,14, ERC 2		
Product characteristics		
Physical state: Solid, > 75µm		
Concentration of substance in product: up to 100%		
1.1 Exposure Scenario		
1.1.1 Contributing scenario (1) controlling environmental exposure		
Amounts used		
Annual amount per site: 1000 t/y		
Frequency and duration of use		
Continuous use Number of emission days: 300 d/y		
Environment factors not influenced by risk management		
Flow rate of receiving surface water: 18,000m ³ /day (default), this results in a dilution factor (DILUTION) of 10, for the marine scenarios, a default dilution factor of 100 was used.		
Other given operational conditions affecting environmental exposure		
-		
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		
If the wastewater is not connected to a municipal sewage treatment plant, on-site wastewater treatment is necessary. The size and efficiency can be compared by scaling.		
Organizational measures to prevent/limit release from site		
Regular inspection/maintenance of workplace to prevent fugitive releases. Do not release wastewater directly into environment.		
Hygiene procedures: work area, equipment and floors regularly cleaned, water spraying to suppressant dust formation		
Competence and training: activities should only be executed by specialists or authorized personnel, regular training and instruction of workers, procedures for process control to minimize release/exposure		
Conditions and measures related to municipal sewage treatment plant		
Size of STP (CAPACITY) >= 2000 m ³ /day		
Degradation efficiency (F _{STP}): >= 90%		
Fraction of release directed to sludge by STP(F _{stpsludge}) = 0.013%		
Conditions and measures related to external treatment of waste for disposal		
-		
Conditions and measures related to external recovery of waste		
-		
1.1.2 Contributing scenario (2) controlling worker exposure		
Amounts used		
-		
Frequency and duration of use/exposure		
> 4h/d		
Human factors not influenced by risk management		
PROC	Exposed skin surface (cm ²)	Exposed skin surface (cm ²)
3	240	2 hands face only
5,9,14	480	2 hands face only
8a	960	2 hands
8b	480	2 hands
Other given operational conditions affecting workers exposure		
Dustiness during process: Medium		
Technical conditions and measures at process level (source) to prevent release		
-		
Technical conditions and measures to control dispersion from source towards the worker		
Indoor without LEV		
Organisational measures to prevent /limit releases, dispersion and exposure		
<ul style="list-style-type: none"> - Minimise number of staff exposed; - Minimisation of manual phases; - Avoidance of contact with contaminated tools and objects; - Regular cleaning of equipment and work area; - Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed; - Training for staff on good practice; 		

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- Good standard of personal hygiene			
Conditions and measures related to personal protection, hygiene and health evaluation			
Avoid contact with the eyes Chemical goggles must be worn when handling the product			
1.2 Exposure estimation and risk characterisation			
Environmental assessment			
Environmental exposure estimation is based on EUSES 2.1, emission (MC=1b, IC=2, UC=33).			
Local emission to wastewater during episode (Elocal.water) = 10 kg/d			
Protection target	PEC	PNEC	RCR
Fresh water(mg/l)	0.0505	0.0622	0.811
Marine water(mg/l)	5.04E-3	0.00622	0.811
STP(mg/l)	0.501	2.17	0.231
Soil(mg/kg)	1.96E-3	8.83E-3	0.222
Man via environment			
Route	Dose	DNEL	RCR
Inhalation(mg/m ³)	3.81E-4	0.0427	3.45E-5
Oral(mg/kg/d)	0.0427	12.5	3.42E-3
Human health assessment			
Human health exposure estimation is based on Ecetoc TRA model, based on the PROC with the highest exposure levels in this scenario (PROC5, or 8a)			
Exposure route	Exposure estimate	DNEL	RCR
Inhalation (mg/m ³)	5	22.05	0.227
Dermal (mg/kg/d)	13.7	25	0.549
Combined RCR			0.775
Combined RCR + Man via environment			0.778
1.3 Guidance to DU to evaluate whether he works inside the boundaries set by the ES			
For fresh water and marine water: $RCR_{Actual} = RCR_{ES} * E_{local.water} * (1 - F_{STP}) * 2000 * DILUTION_{ES} / 10 * 0.1 * CAPACITY * DILUTION_{Actual}$			
For STP: $RCR_{Actual} = RCR_{ES} * E_{local.water} * 2000 / 1.67 * CAPACITY_{Actual}$			
For Soil: $RCR_{Actual} = RCR_{ES} * F_{stpsludge} * E_{local.water} * 2000 / 0.00013 * 10 * CAPACITY_{Actual}$			
Additional good practice advice beyond the REACH CSA			
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH, Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.			
Outdoor use or indoor use with LEV or use with respiratory protection is recommended. Gloves and face shield is recommended.			

2 Exposure Scenario (2): used in synthesis/ used as intermediates		
List of all use descriptors related to the life cycle stage and all the uses under it		
SU 9, PROC 1,2,3,4,8b, ERC 6a,6b		
Product characteristics		
Physical state: Solid, > 75µm		
Concentration of substance in product: up to 100%		
2.1 Exposure Scenario		
2.1.1 Contributing scenario (1) controlling environmental exposure		
Amounts used		
Annual amount per site: 1000 t/y		
Frequency and duration of use		
Continuous use Number of emission days: 300 d/y		
Environment factors not influenced by risk management		
Flow rate of receiving surface water: 18,000m ³ /day (default), this result in a dilution factor (DILUTION) of 10, for the marine scenarios, a default dilution factor of 100 was used.		
Other given operational conditions affecting environmental exposure		
-		
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		
If the wastewater is not connected to a municipal sewage treatment plant, on-site wastewater treatment is necessary. The size and efficiency can be compared by scaling.		
Organizational measures to prevent/limit release from site		
Regular inspection/maintenance of workplace to prevent fugitive releases. Do not release wastewater directly into environment.		
Hygiene procedures: work area, equipment and floors regularly cleaned, water spraying to suppressant dust formation		
Competence and training: activities should only be executed by specialists or authorized personnel, regular training and instruction of workers, procedures for process control to _minimize release/exposure		
Conditions and measures related to municipal sewage treatment plant		
Size of STP (CAPACITY) >= 2000 m ³ /day		
Degradation efficiency (F _{STP}): >= 90%		
Fraction of release directed to sludge by STP(F _{stp} sludge) = 0.013%		
Conditions and measures related to external treatment of waste for disposal		
-		
Conditions and measures related to external recovery of waste		
-		
2.1.2 Contributing scenario (2) controlling worker exposure		
Amounts used		
-		
Frequency and duration of use/exposure		
> 4h/d		
Human factors not influenced by risk management		
PROC	Exposed skin surface (cm ²)	Exposed body part
2,4	480	2 hands face only
1,3	240	One hand face only
8b	480	2 hands
Other given operational conditions affecting workers exposure		
Dustiness during process: Medium		
Technical conditions and measures at process level (source) to prevent release		
-		
Technical conditions and measures to control dispersion from source towards the worker		
Indoor without LEV		
Organisational measures to prevent /limit releases, dispersion and exposure		
<ul style="list-style-type: none"> - Minimise number of staff exposed; - Minimisation of manual phases; - Avoidance of contact with contaminated tools and objects; - Regular cleaning of equipment and work area; - Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed; - Training for staff on good practice; - Good standard of personal hygiene 		
Conditions and measures related to personal protection, hygiene and health evaluation		
Avoid contact with the eyes		

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Chemical goggles must be worn when handling the product			
2.2 Exposure estimation and risk characterisation			
Environmental assessment			
Environmental exposure estimation is based on EUSES 2.1, emission (MC=1b, IC=3, UC=33).			
Local emission to wastewater during episode (Elocal.water) = 1.67 kg/d			
Protection target	PEC	PNEC	RCR
Fresh water(mg/l)	8.75E-3	0.0622	0.141
Marine water(mg/l)	8.72E-4	0.00622	0.14
STP(mg/l)	0.0834	2.17	0.0384
Soil(mg/kg)	2.79E-4	8.83E-3	0.0316
Man via environment			
Route	Dose	DNEL	RCR
Inhalation(mg/m ³)	7.5E-13	11.03	6.8E-14
Oral(mg/kg/d)	2.57E-4	12.5	2.06E-5
Human health assessment			
Human health exposure estimation is based on Ecetoc TRA model, based on the PROC with the highest exposure levels in this scenario (PROC4, or 8b)			
Exposure route	Exposure estimate	DNEL	RCR
Inhalation (mg/m ³)	5	22.05	0.227
Dermal (mg/kg/d)	6.86	25	0.274
Combined RCR			0.501
Combined RCR + Man via environment			0.504
2.3 Guidance to DU to evaluate whether he works inside the boundaries set by the ES			
For fresh water and marine water:			
$RCR_{Actual} = RCR_{ES} * E_{local.water} * (1 - F_{STP}) * 2000 * DILUTION_{ES} / 1.67 * 0.1 * CAPACITY_{Actual} * DILUTION_{Actual}$			
For STP:			
$RCR_{Actual} = RCR_{ES} * E_{local.water} * 2000 / 1.67 * CAPACITY_{Actual}$			
For Soil:			
$RCR_{Actual} = RCR_{ES} * F_{stpsludge} * E_{local.water} * 2000 / 0.00013 * 1.67 * CAPACITY_{Actual}$			
Additional good practice advice beyond the REACH CSA			
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH, Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.			
Outdoor use or indoor use with LEV or use with respiratory protection is recommended.			
Gloves and face shield is recommended.			
Outdoor use or indoor use with LEV or use with respiratory protection is recommended.			
Gloves and face shield is recommended.			

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3 Exposure Scenario (3): polymer production		
List of all use descriptors related to the life cycle stage and all the uses under it		
SU 11,12, PROC 1,2,3,4,8a,8b, ERC 6c,6d		
Product characteristics		
Physical state: liquid		
Concentration of substance in product: 0 - 100%		
3.1 Exposure Scenario		
3.1.1 Contributing scenario (1) controlling environmental exposure		
Amounts used		
Annual amount per site: 300 t/y		
Frequency and duration of use		
Continuous use Number of emission days: 300 d/y		
Environment factors not influenced by risk management		
Flow rate of receiving surface water: 18,000m ³ /day (default), this result in a dilution factor (DILUTION) of 10, for the marine scenarios, a default dilution factor of 100 was used.		
Other given operational conditions affecting environmental exposure		
-		
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		
If the wastewater is not connected to a municipal sewage treatment plant, on-site wastewater treatment is necessary. The size and efficiency can be compared by scaling.		
Organizational measures to prevent/limit release from site		
Regular inspection/maintenance of workplace to prevent fugitive releases. Do not release wastewater directly into environment.		
Hygiene procedures: work area, equipment and floors regularly cleaned, water spraying to suppressant dust formation		
Competence and training: activities should only be executed by specialists or authorized personnel, regular training and instruction of workers, procedures for process control to _minimize release/exposure		
Conditions and measures related to municipal sewage treatment plant		
Size of STP (CAPACITY) ≥ 2000 m ³ /day		
Degradation efficiency (F_{STP}): $\geq 90\%$		
Fraction of release directed to sludge by STP($F_{stp\text{sludge}}$) = 0.013%		
Conditions and measures related to external treatment of waste for disposal		
-		
Conditions and measures related to external recovery of waste		
-		
3.1.2 Contributing scenario (2) controlling worker exposure		
Amounts used		
-		
Frequency and duration of use/exposure		
> 4h/d		
Human factors not influenced by risk management		
PROC	Exposed skin surface (cm ²)	Exposed body part
1,3	240	One hand face only
2,4	480	2 hands face only
8a	960	2 hands
8b	480	2 hands
Other given operational conditions affecting workers exposure		
-		
Technical conditions and measures at process level (source) to prevent release		
-		
Technical conditions and measures to control dispersion from source towards the worker		
Indoor without LEV		
Organisational measures to prevent /limit releases, dispersion and exposure		
<ul style="list-style-type: none"> - Minimise number of staff exposed; - Minimisation of manual phases; - Avoidance of contact with contaminated tools and objects; - Regular cleaning of equipment and work area; - Management/supervision in place to check that the RMMs in place are being used correctly and OCs followed; - Training for staff on good practice; - Good standard of personal hygiene 		
Conditions and measures related to personal protection, hygiene and health evaluation		

Printing date 19-08-2013

Revision: 2.0

Avoid contact with the eyes Chemical goggles must be worn when handling the product			
3.2 Exposure estimation and risk characterisation			
Environmental assessment			
Environmental exposure estimation is based on EUSES 2.1, emission (IC=11, UC=33). Local emission to wastewater during episode (Elocal.water) = 10 kg/d			
Protection target	PEC	PNEC	RCR
Fresh water(mg/l)	0.0505	0.0622	0.811
Marine water(mg/l)	5.04E-3	0.00622	0.811
STP(mg/l)	0.501	2.17	0.231
Soil(mg/kg)	1.56E-3	8.83E-3	0.177
Man via environment			
Route	Dose	DNEL	RCR
Inhalation(mg/m ³)	2.29E-6	11.03	2.08E-7
Oral(mg/kg/d)	1.69E-3	12.5	1.35E-4
Human health assessment			
Human health exposure estimation is based on Ecetoc TRA model, based on the PROC with the highest exposure levels in this scenario (PROC 8a)			
Exposure route	Exposure estimate	DNEL	RCR
Inhalation (mg/m ³)	0.542	22.05	0.0246
Dermal (mg/kg/d)	13.7	25	0.549
Combined RCR			0.573
Combined RCR + Man via environment			0.576
3.3 Guidance to DU to evaluate whether he works inside the boundaries set by the ES			
For fresh water and marine water: $RCR_{Actual} = RCR_{ES} * E_{local.water} * (1 - F_{STP}) * 2000 * DILUTION_{ES} / 10 * 0.1 * CAPACITY_{Actual} * DILUTION_{Actual}$			
For STP: $RCR_{Actual} = RCR_{ES} * E_{local.water} * 2000 / 10 * CAPACITY_{Actual}$			
For Soil: $RCR_{Actual} = RCR_{ES} * F_{stpsludge} * E_{local.water} * 2000 / 0.00013 * 10 * CAPACITY_{Actual}$			
Additional good practice advice beyond the REACH CSA			
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH, Thus, the downstream user is not obliged to i) carry out an own CSA and ii) to notify the use to the Agency, if he does not implement these measures.			
Gloves and face shield is recommended.			