

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 19.07.2018

Version 19.3

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

1.1 Product identifier

| | |
|---------------------------|---|
| Catalogue No. | 102446 |
| Product name | Chloroform-D1 deuteration degree min. 99.96% for NMR spectroscopy MagniSolv™ |
| REACH Registration Number | 01-2120242098-57-XXXX |
| CAS-No. | 865-49-6 |

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

| | |
|-----------------|---|
| Identified uses | Reagent for analysis In compliance with the conditions described in the annex to this safety data sheet. |
|-----------------|---|

1.3 Details of the supplier of the safety data sheet

| | |
|------------------------|--|
| Company | Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0 |
| Responsible Department | LS-QHC * e-mail: prodsafe@merckgroup.com |

| | |
|--------------------------------|---|
| 1.4 Emergency telephone number | Please contact the regional company representation in your country. |
|--------------------------------|---|

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

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Product name Chloroform-D1 deuteration degree min. 99.96% for NMR spectroscopy
MagniSolv™

Acute toxicity, Category 4, Oral, H302

Acute toxicity, Category 3, Inhalation, H331

Skin irritation, Category 2, H315

Eye irritation, Category 2, H319

Carcinogenicity, Category 2, H351

Reproductive toxicity, Category 2, H361d

Specific target organ toxicity - repeated exposure, Category 1, Liver, Kidney, H372

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

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms



Signal word

Danger

Hazard statements

H302 Harmful if swallowed.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H331 Toxic if inhaled.

H351 Suspected of causing cancer.

H361d Suspected of damaging the unborn child.

H372 Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure.

Precautionary statements

Response

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

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breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Reduced labelling (≤125 ml)

Hazard pictograms



Signal word

Danger

Hazard statements

H331 Toxic if inhaled.

H351 Suspected of causing cancer.

H361d Suspected of damaging the unborn child.

H372 Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure.

Precautionary statements

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

CAS-No. 865-49-6

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

3.1 Substance

| | | |
|------------|-------------------|---------------------------|
| Formula | CDCl ₃ | CCl ₃ D (Hill) |
| EC-No. | 212-742-4 | |
| Molar mass | 120,38 g/mol | |

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Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

| CAS-No. | Registration number | Classification |
|---------|---------------------|----------------|
|---------|---------------------|----------------|

| | | |
|---------------------------------------|--|--|
| Chloroform-D1-Deuteration (<= 100 %) | | |
|---------------------------------------|--|--|

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

| | | |
|----------|-----------------------|--|
| 865-49-6 | 01-2120242098-57-XXXX | Acute toxicity, Category 4, H302 Acute toxicity, Category 3, H331 Skin irritation, Category 2, H315 Eye irritation, Category 2, H319 Carcinogenicity, Category 2, H351 Reproductive toxicity, Category 2, H361d Specific target organ toxicity - repeated exposure, Category 1, H372 |
|----------|-----------------------|--|

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

3.2 Mixture

Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures

General advice

First aider needs to protect himself.

After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Consult a physician.

After eye contact: rinse out with plenty of water. Call in ophthalmologist.

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After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately. Subsequently administer: activated charcoal (20 - 40 g in 10% slurry).

4.2 Most important symptoms and effects, both acute and delayed

irritant effects, Cough, Shortness of breath, Dizziness, agitation, spasms, inebriation, Nausea, Vomiting, Stomach/intestinal disorders, ataxia (impaired locomotor coordination), cardiovascular disorders, Headache, respiratory arrest, narcosis
Drying-out effect resulting in rough and chapped skin.

4.3 Indication of any immediate medical attention and special treatment needed

Laxative: Sodium sulfate (1 tablespoon/1/4 l water).

SECTION 5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media

For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Not combustible.

Ambient fire may liberate hazardous vapours.

Fire may cause evolution of:

Hydrogen chloride gas, Phosgene

5.3 Advice for firefighters

Special protective equipment for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information

Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area. Do not inhale vapours.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Observe label precautions.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

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Protected from light. Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

7.3 Specific end use(s)

See exposure scenario in the Annex to this MSDS.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL)

| | | | |
|-------------------------|------------------|------------|------------------------|
| Worker DNEL, acute | Systemic effects | inhalation | 333 mg/m ³ |
| Worker DNEL, longterm | Systemic effects | inhalation | 2,5 mg/m ³ |
| Worker DNEL, longterm | Systemic effects | dermal | 0,94 mg/kg Body weight |
| Worker DNEL, longterm | Local effects | inhalation | 2,5 mg/m ³ |
| Consumer DNEL, longterm | Systemic effects | inhalation | 0,18 mg/m ³ |

Predicted No Effect Concentration (PNEC)

| | |
|-----------------------------------|------------|
| PNEC Fresh water | 0,146 mg/l |
| PNEC Fresh water sediment | 0,45 mg/kg |
| PNEC Marine water | 0,015 mg/l |
| PNEC Marine sediment | 0,09 mg/kg |
| PNEC Aquatic intermittent release | 0,133 mg/l |
| PNEC Soil | 0,56 mg/kg |
| PNEC Sewage treatment plant | 0,048 mg/l |

8.2 Exposure controls

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Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection

Safety glasses

Hand protection

full contact:

| | |
|---------------------|-----------|
| Glove material: | Viton (R) |
| Glove thickness: | 0,70 mm |
| Break through time: | > 480 min |

splash contact:

| | |
|---------------------|--------------|
| Glove material: | butyl-rubber |
| Glove thickness: | 0,7 mm |
| Break through time: | > 10 min |

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 890 Vitoject® (full contact), KCL 898 Butoject® (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

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Other protective equipment

protective clothing

Respiratory protection

required when vapours/aerosols are generated.

Recommended Filter type: Filter AX (EN 371)

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Environmental exposure controls

Do not let product enter drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|-----------------------------|--|
| Form | liquid |
| Colour | colourless |
| Odour | characteristic |
| Odour Threshold | No information available. |
| pH | No information available. |
| Melting point | -64,1 °C |
| Boiling point/boiling range | 60 °C at 1.013 hPa |
| Flash point | Method: Tested according to Directive 92/69/EEC. Not applicable |

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| | |
|------------------|---------------------------|
| Evaporation rate | No information available. |
|------------------|---------------------------|

| | |
|---------------------------|---------------------------|
| Flammability (solid, gas) | No information available. |
|---------------------------|---------------------------|

| | |
|-----------------------|----------------|
| Lower explosion limit | Not applicable |
|-----------------------|----------------|

| | |
|-----------------------|----------------|
| Upper explosion limit | Not applicable |
|-----------------------|----------------|

| | |
|-----------------|---------------------|
| Vapour pressure | 211 hPa at 20 °C |
|-----------------|---------------------|

| | |
|-------------------------|---------------------------|
| Relative vapour density | No information available. |
|-------------------------|---------------------------|

| | |
|---------|------------------------------------|
| Density | 1,50 g/cm ³ at 20 °C |
|---------|------------------------------------|

| | |
|------------------|---------------------------|
| Relative density | No information available. |
|------------------|---------------------------|

| | |
|------------------|--|
| Water solubility | 4,6 g/l at 20 °C Method: OECD Test Guideline 105 |
|------------------|--|

| | |
|--|---|
| Partition coefficient: n-octanol/water | log Pow: 2 (25 °C) (experimental) (IUCRID) Bioaccumulation is not expected. |
|--|---|

| | |
|---------------------------|--|
| Auto-ignition temperature | > 653 °C Method: Tested according to Directive 92/69/EEC. |
|---------------------------|--|

| | |
|---------------------------|--|
| Decomposition temperature | Distillable in an undecomposed state at normal pressure. |
|---------------------------|--|

| | |
|--------------------|---------------------------|
| Viscosity, dynamic | No information available. |
|--------------------|---------------------------|

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| | |
|----------------------|------------------------------|
| Explosive properties | Not classified as explosive. |
|----------------------|------------------------------|

| | |
|----------------------|------|
| Oxidizing properties | none |
|----------------------|------|

9.2 Other data

none

SECTION 10. Stability and reactivity

10.1 Reactivity

See section 10.3

10.2 Chemical stability

heat-sensitive

Sensitivity to light

10.3 Possibility of hazardous reactions

Risk of explosion with:

Ammonia, Amines, nitrogen oxides, bases, Oxygen, alkali amides, organic nitro compounds,
Alcohols, alkali hydroxides, strong alkalis, Fluorine, peroxi compounds, Alkaline earth metals,
Alkali metals, Powdered metals

Methanol, with, alcoholates

Methanol, with, strong alkalis

Iron, in powder form

various alloys, sensitive to shock

Methanol, with, Sodium hydroxide

magnesium, in powder form

Oxygen, with, alkali compounds

Aluminium, in powder form

Acetone, with, alkali compounds

Potassium, sensitive to shock

sodium, sensitive to shock

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Violent reactions possible with:

phosphines, bis(dimethylamino)dimethyl tin, nonmetallic hydrogen compounds, Powdered metals,
Light metals, Ketones, mineral acids, Strong oxidizing agents, semimetallic hydrogen compounds

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

rubber, various plastics

10.6 Hazardous decomposition products

in the event of fire: See section 5.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity

LD50 Rat: 695 mg/kg

(RTECS)

Symptoms: Nausea, Vomiting, Risk of aspiration upon vomiting., Aspiration may cause
pulmonary oedema and pneumonitis.

Acute inhalation toxicity

Acute toxicity estimate: 0,5 mg/l; aerosol

Symptoms: Cough, Shortness of breath, Possible damages:, mucosal irritations, Lung oedema

Acute dermal toxicity

LD50 Rabbit: > 3.980 mg/kg

(IUCLID)

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Skin irritation

Rabbit

Result: slight irritation

(IUCLID) (Regulation (EC) No 1272/2008, Annex VI)

Drying-out effect resulting in rough and chapped skin.

Causes skin irritation.

Eye irritation

Rabbit

Result: slight irritation

(IUCLID) (Regulation (EC) No 1272/2008, Annex VI)

Causes serious eye irritation.

Sensitisation

This information is not available.

Germ cell mutagenicity

This information is not available.

Carcinogenicity

This information is not available.

Reproductive toxicity

This information is not available.

Teratogenicity

This information is not available.

CMR effects

Carcinogenicity:

Suspected of causing cancer.

Teratogenicity:

Suspected of damaging the unborn child.

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Specific target organ toxicity - single exposure

This information is not available.

Specific target organ toxicity - repeated exposure

Causes damage to organs through prolonged or repeated exposure.

Target Organs: Liver, Kidney

Aspiration hazard

This information is not available.

11.2 Further information

Systemic effects:

After absorption:

Dizziness, inebriation, agitation, spasms, narcosis, respiratory arrest

After long-term exposure to the chemical:

drop in blood pressure, Headache, ataxia (impaired locomotor coordination), Stomach/intestinal disorders, cardiovascular disorders

Damage to:

Liver, Kidney, Cardiac

Effect potentiated by: ethanol

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

SECTION 12. Ecological information

12.1 Toxicity

Toxicity to fish

LC50 *Lepomis macrochirus* (Bluegill sunfish): 18 mg/l; 96 h
(IUCLID)

Toxicity to daphnia and other aquatic invertebrates

EC50 *Daphnia magna* (Water flea): 79 mg/l; 48 h
(IUCLID)

EC5 *E.sulcatum*: > 6.560 mg/l; 72 h
(maximum permissible toxic concentration) (IUCLID)

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Toxicity to algae

IC50 *Scenedesmus quadricauda* (Green algae): 1.100 mg/l; 8 d
(maximum permissible toxic concentration) (IUCLID)

Toxicity to bacteria

EC50 *Pseudomonas putida*: 125 mg/l; 16 h
(maximum permissible toxic concentration) (IUCLID)

EC50 activated sludge: 1.010 mg/l; 3 h
OECD Test Guideline 209

12.2 Persistence and degradability

Biodegradability

0 %; 14 d
OECD Test Guideline 301C
Not readily biodegradable.

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: 2 (25 °C)
(experimental)

(IUCLID) Bioaccumulation is not expected.

12.4 Mobility in soil

Distribution among environmental compartments

Adsorption/Soil

log Koc: 1,72
(experimental)

Mobile in soils

12.5 Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

12.6 Other adverse effects

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Henry constant

14084 Pa·m³/mol

Method: (experimental)

(IUCLID) Distribution preferentially in air.

Surface tension

72,3 mN/m

at 20 °C

Method: OECD Test Guideline 115

Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

Waste treatment methods

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

| | |
|-----------------------------------|------------|
| 14.1 UN number | UN 1888 |
| 14.2 Proper shipping name | CHLOROFORM |
| 14.3 Class | 6.1 |
| 14.4 Packing group | III |
| 14.5 Environmentally hazardous | -- |
| 14.6 Special precautions for user | yes |
| Tunnel restriction code | E |

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

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| | |
|-----------------------------------|------------|
| 14.1 UN number | UN 1888 |
| 14.2 Proper shipping name | CHLOROFORM |
| 14.3 Class | 6.1 |
| 14.4 Packing group | III |
| 14.5 Environmentally hazardous | -- |
| 14.6 Special precautions for user | no |

Sea transport (IMDG)

| | |
|-----------------------------------|------------|
| 14.1 UN number | UN 1888 |
| 14.2 Proper shipping name | CHLOROFORM |
| 14.3 Class | 6.1 |
| 14.4 Packing group | III |
| 14.5 Environmentally hazardous | -- |
| 14.6 Special precautions for user | yes |

| | |
|-----|---------|
| EmS | F-A S-A |
|-----|---------|

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

SECTION 15. Regulatory information

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

EU regulations

| | |
|-----------------------|--|
| Major Accident Hazard | SEVESO III |
| Legislation | ACUTE TOXIC H2 Quantity 1: 50 t Quantity 2: 200 t |

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| | |
|---------------------------|---|
| Occupational restrictions | Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable. |
|---------------------------|---|

| | |
|---|---------------|
| Regulation (EC) No 1005/2009 on substances that deplete the ozone layer | not regulated |
|---|---------------|

| | |
|---|---------------|
| Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC | not regulated |
|---|---------------|

| | |
|--|--|
| Substances of very high concern (SVHC) | This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w). |
|--|--|

National legislation

| | |
|---------------|-------|
| Storage class | 6.1 D |
|---------------|-------|

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. Other information

Details in analogy to the undeuterated compound.

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

| | |
|-------|---|
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H319 | Causes serious eye irritation. |
| H331 | Toxic if inhaled. |
| H351 | Suspected of causing cancer. |
| H361d | Suspected of damaging the unborn child. |
| H372 | Causes damage to organs through prolonged or repeated exposure. |

Training advice

Provide adequate information, instruction and training for operators.

Labelling

Hazard pictograms



Signal word

Danger

Hazard statements

H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H331 Toxic if inhaled.
H351 Suspected of causing cancer.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure.

Precautionary statements

Response

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P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

This information is given on the authorised Safety Data Sheet for your country.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.

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EXPOSURE SCENARIO 1 (Industrial use)

1. Industrial use Reagent for analysis)

Sectors of end-use

| | |
|--------------|--|
| <i>SU 3</i> | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| <i>SU 9</i> | Manufacture of fine chemicals |
| <i>SU 10</i> | Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) |

Chemical product category

| | |
|-------------|----------------------|
| <i>PC19</i> | Intermediate |
| <i>PC21</i> | Laboratory chemicals |

Process categories

| | |
|---------------|---|
| <i>PROC1</i> | Use in closed process, no likelihood of exposure |
| <i>PROC2</i> | Use in closed, continuous process with occasional controlled exposure |
| <i>PROC3</i> | Use in closed batch process (synthesis or formulation) |
| <i>PROC8a</i> | Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities |
| <i>PROC8b</i> | Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities |
| <i>PROC9</i> | Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| <i>PROC15</i> | Use as laboratory reagent |

Environmental Release Categories

| | |
|--------------|---|
| <i>ERC1</i> | Manufacture of substances |
| <i>ERC6a</i> | Industrial use resulting in manufacture of another substance (use of intermediates) |

2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling environmental exposure for: ERC1

Amount used

| | |
|-------------------------------|------------|
| Daily amount per site (Msafe) | 829.589 kg |
|-------------------------------|------------|

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| | |
|---------------|---|
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Environment factors not influenced by risk management

| | |
|---------------------------------|-----|
| Dilution Factor (River) | 10 |
| Dilution Factor (Coastal Areas) | 100 |

Other given operational conditions affecting environmental exposure

| | |
|-----------------------------------|---------|
| Number of emission days per year | 365 |
| Emission or Release Factor: Air | 0,07 % |
| Emission or Release Factor: Water | 0,006 % |

Conditions and measures related to municipal sewage treatment plant

| | |
|---|---|
| Type of Sewage Treatment Plant | Municipal sewage treatment plant |
| Flow rate of sewage treatment plant effluent | 10.000 m ³ /d |
| Percentage removed from waste water | 85,6 % |
| Sludge Treatment | Sewage sludge should not be applied to natural soils. |

Conditions and measures related to external treatment of waste for disposal

| | |
|------------------|---|
| Disposal methods | All liquid and solid waste should be incinerated. |
|------------------|---|

2.2 Contributing scenario controlling environmental exposure for: ERC6a

Amount used

| | |
|-------------------------------|----------|
| Daily amount per site (Msafe) | 4.800 kg |
|-------------------------------|----------|

Environment factors not influenced by risk management

| | |
|---------------------------------|-----|
| Dilution Factor (River) | 10 |
| Dilution Factor (Coastal Areas) | 100 |

Other given operational conditions affecting environmental exposure

| | |
|-----------------------------------|-------|
| Number of emission days per year | 300 |
| Emission or Release Factor: Air | 0,5 % |
| Emission or Release Factor: Water | 0,7 % |

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Conditions and measures related to municipal sewage treatment plant

| | |
|--|---|
| Type of Sewage Treatment Plant | Municipal sewage treatment plant |
| Flow rate of sewage treatment plant effluent | 10.000 m3/d |
| Percentage removed from waste water | 85,6 % |
| Sludge Treatment | Sewage sludge should not be applied to natural soils. |

Conditions and measures related to external treatment of waste for disposal

| | |
|------------------|---|
| Disposal methods | All liquid and solid waste should be incinerated. |
|------------------|---|

2.3 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC9, PROC15

Product characteristics

| | |
|---|--|
| Concentration of the Substance in Mixture/Article | Covers the percentage of the substance in the product up to 100 %. |
| Physical Form (at time of use) | High volatile liquid |

Frequency and duration of use

| | |
|------------------|-------------|
| Frequency of use | 8 hours/day |
|------------------|-------------|

Other operational conditions affecting workers exposure

| | |
|------------------|---|
| Outdoor / Indoor | Indoor with local exhaust ventilation (LEV) |
| Outdoor / Indoor | Outdoor |

Technical conditions and measures

Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

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

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Wear suitable gloves (tested to EN374), coverall and eye protection. Wear respiratory protection.

3. Exposure estimation and reference to its source

Environment

| CS | Use descriptor | Msafe | Compartment | RCR | Exposure Assessment Method |
|-----|----------------|---------------|------------------|-----|----------------------------|
| 2.1 | ERC1 | 829589 kg/day | All compartments | < 1 | EUSES |
| 2.2 | ERC6a | 4800 kg/day | All compartments | < 1 | EUSES |

Workers

| CS | Use descriptor | Exposure duration, route, effect | RCR | Exposure Assessment Method |
|-----|----------------|----------------------------------|-----|----------------------------|
| 2.3 | PROC1 | longterm, combined, systemic | < 1 | ECETOC TRA |
| 2.3 | PROC2 | longterm, combined, systemic | < 1 | ECETOC TRA |
| 2.3 | PROC3 | longterm, combined, systemic | < 1 | ECETOC TRA |
| 2.3 | PROC8a | longterm, combined, systemic | < 1 | ECETOC TRA |
| 2.3 | PROC8b | longterm, combined, systemic | < 1 | ECETOC TRA |
| 2.3 | PROC9 | longterm, combined, systemic | < 1 | ECETOC TRA |
| 2.3 | PROC15 | longterm, combined, systemic | < 1 | ECETOC TRA |

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

Please refer to the following documents: ECHA Guidance on information requirements and chemical

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safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users;
ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure
Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH
Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC
Guidance Specific Environmental Release Categories (SPERCs).

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| | |
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EXPOSURE SCENARIO 2 (Professional use)

1. Professional use Reagent for analysis)

Sectors of end-use

SU 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Chemical product category

PC21 Laboratory chemicals

Process categories

PROC15 Use as laboratory reagent

Environmental Release Categories

ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)

ERC8a Wide dispersive indoor use of processing aids in open systems

2. Contributing scenarios: Operational conditions and risk management measures

2.1 Contributing scenario controlling environmental exposure for: ERC6a

Amount used

| | |
|-------------------------------|----------|
| Daily amount per site (Msafe) | 4.800 kg |
|-------------------------------|----------|

Environment factors not influenced by risk management

| | |
|---------------------------------|-----|
| Dilution Factor (River) | 10 |
| Dilution Factor (Coastal Areas) | 100 |

Other given operational conditions affecting environmental exposure

| | |
|-----------------------------------|-------|
| Number of emission days per year | 300 |
| Emission or Release Factor: Air | 0,5 % |
| Emission or Release Factor: Water | 0,7 % |

Conditions and measures related to municipal sewage treatment plant

| | |
|--------------------------------|----------------------------------|
| Type of Sewage Treatment Plant | Municipal sewage treatment plant |
| Flow rate of sewage treatment | 10.000 m3/d |

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| | |
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plant effluent

Percentage removed from waste 85,6 %

water

Sludge Treatment Sewage sludge should not be applied to natural soils.

Conditions and measures related to external treatment of waste for disposal

Disposal methods All liquid and solid waste should be incinerated.

2.2 Contributing scenario controlling environmental exposure for: ERC8b

Amount used

Daily amount per site (Msafe) 5 kg

Environment factors not influenced by risk management

Dilution Factor (River) 10

Dilution Factor (Coastal Areas) 100

Other given operational conditions affecting environmental exposure

Number of emission days per year 365

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant none

Conditions and measures related to external treatment of waste for disposal

Disposal methods All liquid and solid waste should be incinerated.

2.3 Contributing scenario controlling worker exposure for: PROC15

Product characteristics

Concentration of the Substance in Mixture/Article Covers the percentage of the substance in the product up to 100 %.

Physical Form (at time of use) High volatile liquid

Frequency and duration of use

The Safety Data Sheets for catalogue items are available at www.merckgroup.com

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Frequency of use 8 hours/day

Other operational conditions affecting workers exposure

Outdoor / Indoor Indoor with local exhaust ventilation (LEV)

Technical conditions and measures

Provide extraction ventilation at points where emissions occur.

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

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

Wear suitable gloves (tested to EN374), coverall and eye protection.

3. Exposure estimation and reference to its source

Environment

| CS | Use descriptor | Msafe | Compartment | RCR | Exposure Assessment Method |
|-----|----------------|-------------|------------------|-----|----------------------------|
| 2.1 | ERC6a | 4800 kg/day | All compartments | < 1 | EUSES |
| 2.2 | ERC8b | < 5 l/day | All compartments | < 1 | EUSES |

Workers

| CS | Use descriptor | Exposure duration, route, effect | RCR | Exposure Assessment Method |
|-----|----------------|----------------------------------|-----|----------------------------|
| 2.3 | PROC15 | longterm, combined, systemic | < 1 | ECETOC TRA |

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

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safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users;
ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure
Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH
Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC
Guidance Specific Environmental Release Categories (SPERCs).