

MONOETHYLENE GLYCOL >99%**Code : 14223****Responsible for distribution:**

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In case of emergency:

Belgium:
Antipoison Center - Brussels :
TEL: 070/245.245

The Netherlands:
National Poisoning Information Center - Bilthoven :
TEL: 030/274.88.88 (Information only for professionals in case of acute intoxications)

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

Chemical description : Monoethylene glycol , Ethylene glycol , 1,2-Ethandiol , 1,2-Dihydroxy ethane , MEG.
Type of product : Pure product .
Reach registration number : 01-2119456816-28

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

Identified use(s) : See table on the front page of the annex.
Use(s) advised against : This product is not recommended for any industrial, professional or consumer use other than identified in table on the front page of the annex.

1.3. Details of the supplier of the safety data sheet

Company identification : See heading of Material Safety Data Sheet.

1.4. Emergency telephone number

Emergency phone number : See heading of Material Safety Data Sheet.

SECTION 2. Hazards identification**2.1. Classification of the substance or mixture****Classification according to Directive 67/548/EEC or 1999/45/EC**

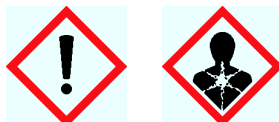
Harmful (Xn; R22)

Classification according to Regulation (EC) No 1272/2008

Acute toxicity, oral - Category 4 - Warning (Acute Tox. 4, oral; H302)
Specific Target Organ Toxicity - Repeated exposure - Category 2 - Warning (STOT RE 2; H373)

2.2. Label elements**Label in accordance with Regulation (EC) No 1272/2008**

• Dangerous ingredient(s) : Ethylene glycol
• Hazard pictogram(s)



• Signal word : Warning
• Hazard statements : H302 - Harmful if swallowed. H373 - May cause damage to organs through prolonged or repeated exposure.
• Precautionary statements
- Prevention : P260 - Do not breathe dust, fume, gas, mist, vapours, spray. P264 - Wash skin thoroughly after handling. P270 - Do not eat, drink or smoke when using this product.

MONOETHYLENE GLYCOL >99%

Code : 14223

SECTION 2. Hazards identification (continued)

- Response : P301+P312 - IF SWALLOWED : Call a POISON CENTER or doctor if you feel unwell. P330 - Rinse mouth.
- Disposal considerations : P501 - Dispose of this material and its container to hazardous or special waste collection point.

2.3. Other hazards

- Physical/chemical hazards : No significant danger.
- Hazards for the health : A health dangerous concentration in the air will not or very slowly be reached by evaporation of this substance at app. 20°C; by spraying much faster. The product may cause central nervous system depression.
- Hazards for the environment : No significant danger. This product is no substance or contains no PBT or vPvB (in accordance with Annex XIII).
- Hazards for the safety : Vapor mixes readily with air.

SECTION 3. Composition/information on ingredients

3.1. Substances

| Name component(s) | Weight % | CAS nr | EINECS nr | Index nr | Reach nr | CLASSIFICATION |
|-------------------|----------|----------|-----------|--------------|------------------|--|
| Ethylene glycol | : > 99 % | 107-21-1 | 203-473-3 | 603-027-00-1 | 01-2119456816-28 | Xn; R22 ----- Acute Tox. 4 (oral); H302 STOT RE 2; H373 |

The full text of the R-phrases and (EU)H-statements is in section 16.

SECTION 4. First aid measures

4.1. Description of first aid measures

- General : CALL A PHYSICIAN IN ALL CIRCUMSTANCES.
Never give anything by mouth to an unconscious person.
- First Aid Measures
- Inhalation : Remove victim into fresh air.
Allow the affected person to rest.
If not breathing, give artificial respiration.
Consult a doctor.
- Skin Contact : Remove contaminated clothing.
Rinse skin with mild soap and plenty of water. (shower if necessary).
Consult a doctor.
- Eye Contact : Rinse immediately thoroughly and long (at least 15 min.) with plenty of water.
Remove contact lenses.
Consult eye doctor.
- Ingestion : DO NOT INDUCE VOMITING. Rinse mouth with water.
Give victim water to drink (not when the person is unconscious).
Seek medical attention immediately or take to hospital.
Administer activated carbon

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

See section 11.

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

MONOETHYLENE GLYCOL >99%**Code : 14223****SECTION 4. First aid measures (continued)**

For specialist advice doctors should contact the NVCI or the Belgian Poison center.

SECTION 5. Firefighting measures**5.1. Extinguishing media**

Extinguishing Media

- Suitable : Extinguishing powder , Alcohol resistant foam , Carbon dioxide (CO₂) , Water spray .
- Insuitable : Heavy water stream .

5.2. Special hazards arising from the substance or mixture

Special Exposure Hazards : Fire may liberate carbon oxides (CO) and smoke.

5.3. Advice for firefighters

- Special Protective Equipment for Firefighters : Use self-contained breathing apparatus and wear protective clothes when in close proximity to fire.
- Special Procedures : Apply water spray or fog to cool nearby equipment. Avoid fire-fighting water to enter environment.

SECTION 6. Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Personal Precautions : Eliminate every possible source of ignition (open fire, sparks, smoking, ...).
Evacuate all personnel immediately and ventilate area.
Avoid breathing vapour and contact with skin, eyes and clothing. Wear recommended personal protective equipment. (See section 8)

6.2. Environmental precautions

Environmental Precautions : Shut off leaks if without risks.
Dike in the spilled product as much as possible with inert material.
Prevent entry of product in public water, sewers or soil.
Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for Cleaning Up : Collect the spillage in closable, suitable disposal containers.
Clean up any spills as soon as possible, using an inert absorbent material.
Residue is to be washed down with plenty of water.

6.4. Reference to other sections

For personal protection, see section 8.
For the removal of the waste product, see section 13.

SECTION 7. Handling and storage**7.1. Precautions for safe handling**

Handling : Pay attention : SKIN ABSORPTION !
AVOID FOG TRANSFORMATION ! STRONG HYGIENE !
Avoid breathing vapour and contact with skin, eyes and clothing. Wear recommended personal protective equipment. (See section 8)
When using, do not eat, drink or smoke.
Emergency eye wash fountains and showers should be available in the immediate vicinity of any potential exposure.

MONOETHYLENE GLYCOL >99%

Code : 14223

SECTION 7. Handling and storage (continued)

7.2. Conditions for safe storage, including any incompatibilities

- Storage : Keep only in the original, safely locked container in a cool, well ventilated and dry place.
All dangerous products should be placed on a drip tray or should be barreled.
Keep away from : Oxidizing agents , Oxidizing acids .
Storage temperature: 0-40 °C
- Protection against Fire and Explosion : Remove all sources of ignition (open fire, sparks, smoking, ...).
- Packaging Material : Polypropylene , Polyethylene , Stainless steel .
- Insuitable Packaging Material : Rubber , Aluminium .

7.3. Specific end use(s)

For identified uses, see subsection 1.2 and/or exposure scenarios.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

- Occupational Exposure Limits : Ethylene glycol : Limit value (BE) : 20 ppm (52 mg/m³) (2011) (D) (M)
Ethylene glycol : Short time value (BE) : 40 ppm (104 mg/m³) (2011) (D) (M)
Ethylene glycol : Limit value (TWA 8 h) (NL) : 20 ppm (52 mg/m³) (2007) (H)
Ethylene glycol : Limit value (TWA 15 min) (NL) : 40 ppm (104 mg/m³) (2007) (H)
(D) The mention "D" means that the absorption of the agent by skin, mucous membranes or eyes constitutes an important part of the total exposition. This absorption can be the consequence of direct contact as well as his presence in the air.
(H) The addition of an "H" indicates that the substance is relative easily absorbed by the skin.
(M) The mention "M" means that the exposition above the limit value causes irritation or that there is a danger for acute poisoning. The work procedure has to be designed somehow or other that the exposition doesn't exceed the limit value. During a control, the sample period should be so short as possible to carry out a reliable measurement. The mesure result is then related to the considered period.
- Biological limit values : They will be included when available.
- DNELs : • Ethylene glycol : Worker, long-term - local effects, inhalation : 35 mg/m³
• Ethylene glycol : Worker, long-term - systemic effects, inhalation : 35 mg/m³
• Ethylene glycol : Consumer, long-term - local effects, inhalation : 7 mg/m³
• Ethylene glycol : Consumer, long-term - local effects, dermal : 53 mg/kg bw/ day
• Ethylene glycol : Consumer, long-term - systemic effects, inhalation : 7 mg/m³
• Ethylene glycol : Consumer, long-term - systemic effects, dermal : 53 mg/kg bw/ day
• Ethylene glycol : Worker, long-term - systemic effects, dermal : 106 mg/kg bw/ day
- PNECs : • Ethylene glycol : Fresh water : 10 mg/l
• Ethylene glycol : Marine water : 1 mg/l
• Ethylene glycol : Intermittent release : 10 mg/l
• Ethylene glycol : Fresh water sediment : 20,9 mg/kg
• Ethylene glycol : Soil : 1,53 mg/kg
• Ethylene glycol : Sewage treatment plant : 199,5 mg/l

8.2. Exposure controls

- Engineering Measures : Ventilation , Local exhaust .
- Personal Protection Equipment :
- Respiratory protection : CE-approved mask for organic vapours and solvents (type A, brown).

MONOETHYLENE GLYCOL >99%

Code : 14223

SECTION 8. Exposure controls/personal protection (continued)

- Skin protection : Suitable protective clothing .
- Hand protection : Suitable material for safety gloves (EN 374):
Butyl rubber : penetration time > 480' - thickness 0,7 mm
Neoprene : penetration time > 480' - thickness 0,5 mm
Nitril rubber : penetration time > 480' - thickness 0,4 mm
- Eye/Face protection : Closed safety glasses or face shield.
- Environmental exposure controls : See sections 6, 7, 12 en 13.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

See technical data sheet for detailed information.

- Physical State (20°C) : Viscous liquid .
- Form/Colour : Colourless .
- Odour : Odourless .
- Odour threshold : Not applicable.
- pH value : 5,5 - 7,5 (50% Sol.).
- Melting/Freezing point : No data available.
- Congealing/Melting point : -13 °C
- Boiling Point/Range (1013 hPa) : 197,4 °C
- Flash point : 111 °C
- Fire hazard : P4
- Evaporation rate : app. 2500 (Ether = 1)
- Explosion limits in air : 3,2 - 43 vol.%
- Vapour pressure (25°C) : 0,012 kPa
- Relative vapour density (air=1) : 2,1
- Relative density of saturated vapour/air mixture (air=1) : 1,00
- Relative density (water=1) : 1,1
- Solubility in water : Complete solubility .
- Soluble in : Polar solvents .
- Log P Octanol/Water (20°C) : -1,36
- Auto-ignition temperature : 398 °C
- Minimum ignition energy : No data available.
- Decomposition temperature : > 500 °C
- Viscosity (25°C) : 16,1 mPa.s (Dynamic)
- Explosive properties : No chemical groups associated with explosive properties .
- Oxidizing properties : No chemical groups associated with oxidizing properties .

9.2. Other information

- Hygroscopic .
- Surface tension (20°C) : 48 mN/m
- Specific leading : 1,16*10E8 pS/m
- Thermal expansion coefficient : 0,00057 v/v °C
- * % Volatiles (by weight) : > 99

MONOETHYLENE GLYCOL >99%**Code : 14223****SECTION 10. Stability and reactivity****10.1. Reactivity**

Reactivity : Reacts violently with: Oxidizing agents , Oxidizing acids .

10.2. Chemical stability

* Stability : Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions : Reacts violently with acids => May cause explosion and fire !

10.4. Conditions to avoid

Conditions to avoid : High temperatures , Moisture , Direct sunlight .

10.5. Incompatible materials

Materials to avoid : Oxidizing agents , Oxidizing acids , Aluminium , Rubber .

10.6. Hazardous decomposition productsHazardous Decomposition Products : Carbon oxides (CO₂, CO).**SECTION 11. Toxicological information****11.1. Information on toxicological effects**

Acute toxicity

- * - Inhalation : The product may cause central nervous system depression resulting in diminuation of consciousness.
Symptoms include: Sore throat , Cough , Drowsiness , Dizziness , Loss of coordination , Nausea ,
High concentrations : Unconsciousness .
- Skin contact : Symptoms include: Redness , Pain .
• Ethylene glycol : LD50 (Rabbit, dermal) : 9530 mg/kg
- Ingestion : Harmful if swallowed.
Symptoms include: Convulsions , Nausea , Shortness of breath , Trembling , Unconsciousness .
• Ethylene glycol : LD50 (Rat, oral) : 7712 mg/kg
- Skin corrosion/irritation : Skin contact can damage eczema.
- Serious eye damage/irritation : Slight irritation .
- * Aspiration hazard : In serious cases: Hart and lungdeviations may occur.
- Respiratory or skin sensitisation : Not sensitive .
- Carcinogenicity : Not listed as carcinogenic .
- Mutagenicity : Not listed as mutagenic .
- Reproductive toxicity : Not listed for reproductive toxicity .
Cause toxic effects to animals; is considered als a side effect of the maternal toxicity.
- Specific target organ toxicity - single exposure : To human : Listed not for organ toxicity .
For animals : No effects known.
- Specific target organ toxicity - repeated exposure : To human : May cause damage to organs through prolonged or repeated exposure.
(Target organ : Kidneys)

SECTION 12. Ecological information**12.1. Toxicity**

MONOETHYLENE GLYCOL >99%**Code : 14223****SECTION 12. Ecological information (continued)**

Ecotoxicity : • Ethylene glycol : EC50 (Algae, 96 h) : 6500 - 13000 mg/l (Pseudokirchneriella subcapitata)
• Ethylene glycol : EC50 (Daphnia magna, 48 h) : > 100 mg/l
• Ethylene glycol : LC50 (Fish, 96 h) : 72860 mg/l (Pimephales promelas)

12.2. Persistence and degradability

Persistence and degradability : • Ethylene glycol : Persistence and degradability : Easily biodegradable .

12.3. Bioaccumulative potential

Bioaccumulation : • Ethylene glycol : Bioaccumulation : No

12.4. Mobility in soil

Mobility : • Ethylene glycol : Mobility : Completely soluble in water .

12.5. Results of PBT and vPvB assessment

Evaluation : • Ethylene glycol : PBT/vPvB : No

12.6. Other adverse effects

WGK class (DE) : 1 (Weak water pollutant)

Water damaging (NL) : 11

Decontamination exertion (NL) : B

Photochemical ozone creation potential : No data available.

Ozone depletion potential : No data available.

Endocrine disrupting potential : No data available.

Global warming potential : No data available.

SECTION 13. Disposal considerations**13.1. Waste treatment methods**

Waste from residues/Unused products : The product has to be destroyed according to national or local legislation, by a company specialised in handling hazardous waste products.

European list of waste products : XXXXXX - European waste product code. This code is assigned on the basis of the most current applications and can not be representative for pollutions which are arisen at the effective use of the product. The producer of the waste has to evaluate its process himself and has to grant the appropriate waste coding. See Decision 2001/118/EC.

Removal contaminated packaging : Packing is to be used exclusively for the packing of this product.
After use, empty and close the packing very carefully.
In case of returned packing, the empty packing can be offered back to the supplier.

SECTION 14. Transport information**14.1. UN number**

UN Number : -

14.2. UN proper shipping name

ADR Name : -

ADN Name : -

IMDG Name : -

* IATA Name : -

14.3. Transport hazard classe(s)

MONOETHYLENE GLYCOL >99%

Code : 14223

SECTION 14. Transport information (continued)

Class : -

14.4. Packing group

Packaging Group : -

14.5. Environmental hazards

Environmentally hazard : No

Marine pollutant : No

14.6. Special precautions for user

Danger number : -

Hazard Label(s) : -

EmS-N° : -

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

Type ship : 3

Pollution category : Y

SECTION 15. Regulatory information

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

Inventories : Australian inventory (AICS): Listed in inventory.
 Canadian inventory (DSL): Listed in inventory.
 Chinese inventory (IECS): Listed in inventory.
 European inventory (EINECS): Listed in inventory.
 Japanese inventory (ENCS): Listed in inventory.
 Korean inventory (KECI): Listed in inventory.
 Philippine inventory (PICCS): Listed in inventory.
 Inventory of the United States (TSCA): Listed in inventory.

NFPA n° : 2-1-0

Relevant EU Rule(s) : Directive 92/85/EEC of the Council of 19 October 1992 on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding
 Directive 98/24/EC of the Council of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work
 Directive 1999/13/EC of the Council of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations
 Directive 2004/42/CE of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC
 Decision 2001/118/EC of the Commission of 16 January 2001 amending Decision 2000/532/EC as regards the list of wastes
 Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
 Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (Reach)

15.2. Chemical Safety Assessment

A chemical safety assessment has been carried out for the substance(s) that make up this material or for the material itself.

MONOETHYLENE GLYCOL >99%**Code : 14223****SECTION 16. Other information**

This safety data sheet has been drawn up in accordance with Regulation (EU) No 453/2010.
This safety data sheet is exclusively made for industrial/professional use.

* Has changed compared to previous revision.

Changes : General revision .

Sources of used key data : The information contained herein is based on the present state of our knowledge (Producer(s) , Chemical cards , ...).
See also on the webaddress:
<http://apps.echa.europa.eu/registered/registered-sub.aspx#search>

R-phras(e)s : R22 - Harmful if swallowed.

(EU)H-statement(s) : H302 - Harmful if swallowed.
H373 - May cause damage to organs through prolonged or repeated exposure.

List of abbreviations and acronyms : ADN (Accord européen relatif au transport international des marchandises Dangereuses par voie de Navigation interieur) : European agreement concerning the international carriage of dangerous goods by inland waterways
ADR (Accord européen relatif au transport international des marchandises Dangereuses par Route) : European agreement concerning the international carriage of dangerous goods by road
CO : Carbon monoxide
DNEL (Derived No Effect Level) : an estimated safe exposure level
EmS (Emergency Schedule) : the first code refers to the relevant fire schedule and the second code refers to the relevant spillage schedule
IATA (International Air Transport Association) : provisions concerning the international carriage of dangerous goods by air
IMDG (International Maritime Dangerous Goods code)
NFPA (National Fire Protection Association) or fire diamant
PNEC (Predicted No Effect Concentration) : concentration below which exposure to a substance is not expected to cause adverse effects
REACH : Registration, Evaluation, Authorisation and restriction of Chemicals
WGK (Wassergefährdungsklasse) : a German classification of substances that indicate the environmental hazard for surface water

This information is to our knowledge correct and complete on the date of issue of this safety data sheet. The information only concerns the product and does not give any guarantee for the quality and the completeness of the properties of the product, or in case of mixing or using in any other process. It remains the responsibility of the user to assure himself that the information is suitable and complete concerning the special use he makes of the product.
BRENNTAG denies all responsibility for loss or damage resulting from the use of these data.

End of document

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| 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 | Manufacture of substance | 3 | NA | NA | 1, 2, 3, 4, 8a, 8b, 15 | 1 | NA | ES0004676 |
| 2 | Use as an intermediate | 3 | NA | NA | 1, 2, 3, 4, 8a, 8b, 9, 15 | 6a | NA | ES5 |
| 3 | Distribution of substance | 3 | NA | NA | 1, 2, 3, 4, 8a, 8b, 9, 15 | 1 | NA | ES10 |
| 4 | Formulation & (re)packing of substances and mixtures | 3 | NA | NA | 1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15 | 2 | NA | ES12 |
| 5 | Polymer production | 3 | NA | NA | 1, 2, 3, 4, 5, 6, 8a, 8b, 9, 15 | 6c | NA | ES262 |
| 6 | Production of rigid foam | 21 | NA | 32 | NA | 8f | NA | ES43 |
| 7 | Uses in coatings | 3 | NA | NA | 1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15 | 4 | NA | ES16 |
| 8 | Use in coatings/adhesives/sealants/foams/polymer processing | 22 | NA | NA | 1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 14, 15, 19 | 8d | NA | ES18 |
| 9 | Uses in coatings | 21 | NA | 9a, 15, 18, 31 | NA | 8d | NA | ES148 |
| 10 | Use in adhesives and sealants | 21 | NA | 1 | NA | 8c | NA | ES31 |
| 11 | Use in Cleaning Agents | 3 | NA | NA | 1, 2, 3, 4, 7, 8a, 8b, 10, 13 | 4 | NA | ES35 |
| 12 | Use in Cleaning Agents | 22 | NA | NA | 1, 2, 3, 4, 8a, 8b, 10, 11, 13 | 8a | NA | ES38 |
| 13 | Use in Cleaning Agents | 21 | NA | 35 | NA | 8a | NA | ES32 |
| 14 | Use in agrochemicals | 22 | NA | NA | 1, 2, 4, 8a, 8b, 9, 11, 13 | 8d | NA | ES236 |
| 15 | Use as lubricants | 3 | NA | NA | 1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18 | 4 | NA | ES108 |
| 16 | Use as Functional | 3 | NA | NA | 1, 2, 3, 4, | 7 | NA | ES241 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | Fluids | | | | 8a, 8b, 9 | | | |
|----|--|----|----|--------|---|--------|----|--------|
| 17 | Use as Functional Fluids | 22 | NA | NA | 1, 2, 3, 8a, 9, 20 | 9b | NA | ES243 |
| 18 | Use in heat transfer and hydraulic fluids | 21 | NA | 16, 17 | NA | 9b | NA | ES266 |
| 19 | Use in laboratories | 3 | NA | NA | 15 | 2, 4 | NA | ES116 |
| 20 | Use in laboratories | 22 | NA | NA | 15 | 8a | NA | ES118 |
| 21 | Use in metal working fluids / rolling oils | 3 | NA | NA | 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 17 | 4 | NA | ES111 |
| 22 | Use in metal working fluids / rolling oils | 22 | NA | NA | 1, 2, 3, 5, 8a, 8b, 9, 10, 11, 13, 17 | 8a | NA | ES128 |
| 23 | Use in de-icing and anti-icing applications | 22 | NA | NA | 1, 2, 8a, 8b, 11 | 8d | NA | ES87 |
| 24 | Use in de-icing and anti-icing applications | 21 | NA | 4 | NA | 8d | NA | ES101 |
| 25 | Use as water treatment chemicals | 3 | NA | NA | 1, 2, 3, 4, 8a, 8b, 13 | 3 | NA | ES120 |
| 26 | Use in Oil and Gas field drilling and production operations | 3 | NA | NA | 1, 2, 3, 4, 8a, 8b | 4 | NA | ES9888 |
| 27 | Use as a process chemical | 3 | NA | NA | 1, 2, 3, 4, 5, 8a, 8b, 9, 13, 14, 15 | 4 | NA | ES143 |
| 28 | Other consumer uses | 21 | NA | 28, 39 | NA | 8a, 8d | NA | ES9886 |
| 29 | Polymer production use in foams, in coatings, in adhesives, in sealants. | 3 | NA | NA | 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15 | 6c | NA | ES37 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

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1. Short title of Exposure Scenario 1: Manufacture of substance

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| 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 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 PROC15: Use as laboratory reagent |
| Environmental Release Categories | ERC1: Manufacture of substances |
| Activity | Manufacture of substance or use as process chemical or extracting agent. Includes recycling/recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities. |

2.1 Contributing scenario controlling environmental exposure for: ERC1

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 1 |
| | Maximum daily site tonnage (kg/day): | 86773 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,01 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,01 % |
| initial release prior to RMM Regional only | | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

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

| | |
|--|---|
| Air | No air emission controls required; required removal efficiency is 0%. |
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, 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) | liquid |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC2, PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: Wear respiratory protection(PROC8a) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOG spERC 1.1v1 has been used to evaluate the exposure for the environment

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|-----------------|-------------------|-----|
| PA100392_001 | | | 4/100 | EN |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|-----------------------|-----|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2 | --- | Worker - inhalative, long-term - local and systemic. | 12,92mg/m ³ | 0,37 |
| PROC2 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

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1. Short title of Exposure Scenario 2: Use as an intermediate

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC15: Use as laboratory reagent</p> |
| Environmental Release Categories | ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) |
| Activity | Use as an intermediate (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container). |

2.1 Contributing scenario controlling environmental exposure for: ERC6a

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,015 |
| | Maximum daily site tonnage (kg/day): | 50000 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,002 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 1 % |
| | initial release prior to RMM | |
| | Emission or Release | 0,1 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | Factor: Soil | |
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC9) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: | |
| | Wear respiratory protection(PROC8a) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 6.1a.v1 has been used to evaluate the exposure for the environment

Workers

ECETOC TRA Version 2 with modifications has been used.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|------------------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b, PROC9, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Please note that modified version has been used (see exposure estimates).

For scaling see: <http://www.ecetoc.org/tra>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

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1. Short title of Exposure Scenario 3: Distribution of substance

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC15: Use as laboratory reagent</p> |
| Environmental Release Categories | ERC1: Manufacture of substances |
| Activity | Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, distribution and associated laboratory activities. |

2.1 Contributing scenario controlling environmental exposure for: ERC1

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 6667 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,001 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 0,001 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,001 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC9) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: | |
| | Wear respiratory protection(PROC8a) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 1.1b.v1 has been used to evaluate the exposure for the environment

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|-----------------|-------------------|-----|
| PA100392_001 | | 10/100 | | EN |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|------------------------------|-----|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b, PROC9, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

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1. Short title of Exposure Scenario 4: Formulation & (re)packing of substances and mixtures

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC15: Use as laboratory reagent</p> |
| Environmental Release Categories | ERC2: Formulation of preparations |
| Activity | Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities. |

2.1 Contributing scenario controlling environmental exposure for: ERC2

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,03 |
| | Maximum daily site tonnage (kg/day): | 100000 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,5 % |
| | initial release prior to RMM | |
| | Emission or Release | 0,5 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|--|---|
| | Factor: Water | |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,01 % |
| | initial release prior to RMM Regional only | |
| <p>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</p> | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC14) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: Wear respiratory protection(PROC8a) | |
| | Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 2.2.v1 has been used to evaluate the exposure for the environment

PA100392_001

13/100

EN

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

Monoethylene glycol

Version 2.0

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Revision Date 28.01.2013

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|------------------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b, PROC9, PROC14 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71 mg/kg bw/day | 0,13 |
| PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC14 | --- | Worker - dermal, long-term - systemic | 3,43mg/kg bw/day | 0,03 |
| PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 5: Polymer production

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC6: Calendering operations</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC15: Use as laboratory reagent</p> |
| Environmental Release Categories | ERC6c: Industrial use of monomers for manufacture of thermoplastics |

2.1 Contributing scenario controlling environmental exposure for: ERC6c

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,015 |
| | Maximum daily site tonnage (kg/day): | 50000 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,2 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,01 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC5, PROC8b, PROC9) |
| | Exposed skin areas | Two hands 960 cm ² (PROC6, PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5) | |
| | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC6) | |
| | If no LEV: Wear respiratory protection(PROC8a) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 4.20 v1 has been used to evaluate the exposure for the environment

Workers

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|--|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC5 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC5, PROC6, PROC8b, PROC9, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC6 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 6: Production of rigid foam

| | |
|----------------------------------|---|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Chemical product category | PC32: Polymer preparations and compounds |
| Environmental Release Categories | ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix |

2.1 Contributing scenario controlling environmental exposure for: ERC8f

| | | |
|--|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 5 %. |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data.Other information | Local freshwater dilution factor:: 10 |
| | Other data.Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 15 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,5 % |
| initial release prior to RMM Regional only | | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | | |

2.2 Contributing scenario controlling consumer exposure for: PC32

| | | |
|-------------------------|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 5 %. |
|-------------------------|---|---|

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|--|
| | Physical Form (at time of use) | liquid |
| Amount used | Amount used per event | 0,825 kg |
| Frequency and duration of use | Exposure duration | 30 min |
| Human factors not influenced by risk management | Exposed skin areas | Hands and forearms. 1900 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 57,5 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 1,5 |
| | Covers use under typical household ventilation. | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model.

Consumers

ConsExpo 4.1

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|---|-----------------------|-------|
| PC32 | --- | consumer inhalation, long term - systemic | 0,06mg/m ³ | 0,009 |
| PC32 | --- | consumer dermal, long term - systemic | 0,007mg/kg bw/day | 0,008 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 7: Uses in coatings

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p> |
| Environmental Release Categories | ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |
| Activity | Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities. |

2.1 Contributing scenario controlling environmental exposure for: ERC4

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 1 |
| | Maximum daily site tonnage (kg/day): | 39945 kg |
| Frequency and duration of use | Continuous exposure | 220 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 98 % |
| | initial release prior to RMM | |
| | Emission or Release | 2 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | Factor: Water | |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| | initial release prior to RMM Regional only | |
| <p>Technical conditions and measures at process level (source) to prevent release</p> <p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p> <p>Organizational measures to prevent/limit release from the site</p> <p>Conditions and measures related to external treatment of waste for disposal</p> | Air | Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 95 %) |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |
| | Waste treatment | Wet scrubber for elimination of volatile components from waste gases, or, Filtration aids |
| <p>2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15</p> | | |
| 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) | liquid |
| Amount used | | 600 mL/min (PROC7) |
| | Regular inspection and maintenance of equipment and machines.(PROC7) | |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC7) |
| | Frequency of use | 240 days/year(except PROC7) |
| | Exposure duration per day | < 6 h(Critical for: PROC7) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC7) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC5, PROC8b, PROC13) |
| | Exposed skin areas | Whole body (PROC7) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m3(PROC7) |
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SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | |
|--|--|
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) |
| | Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Ensure that the task is not carried out overhead. Regular inspection and maintenance of equipment and machines. Clean equipment and the work area every day.(PROC7) |
| | Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5) |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: Wear respiratory protection(PROC8a) |
| | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13) |
| | Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7) |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. CEPE spERC 4.nb.v1 has been used to evaluate the exposure for the environment

Workers

PROC7 StoffenManager (inhalation exposure)

PROC7 RISKOFDERM.

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC13, PROC15 ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|------------------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC5, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC5, PROC8b, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|----------------|-----|--|------------------------|------|
| PROC7 | --- | Worker - inhalative, long-term - local and systemic. | 9,79mg/m ³ | 0,28 |
| PROC7 | --- | Worker - dermal, long-term - systemic | 54,6mg/m ³ | 0,52 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC10, PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,87mg/m ³ | 0,74 |
| PROC10 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC7

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC7

Please note that modified version has been used (see exposure estimates).

Scaling for PROC7 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC7 (inhalation) <https://www.stoffenmanager.nl/default.aspx>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 8: Use in coatings/adhesives/sealants/foams/polymer processing

| | |
|----------------------------------|---|
| Main User Groups | SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC15: Use as laboratory reagent</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p> |
| Environmental Release Categories | ERC8d: Wide dispersive outdoor use of processing aids in open systems |
| Activity | Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation) and equipment cleaning, maintenance and associated laboratory activities. |

2.1 Contributing scenario controlling environmental exposure for: ERC8d

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|--|
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 98 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 2 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM Regional only | | |
| 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 | Air | Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 95 %) |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |
| | | |
| Conditions and measures related to external treatment of waste for disposal | Waste treatment | Wet scrubber for elimination of volatile components from waste gases, or, Filtration aids |
| 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19 | | |
| 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) | liquid |
| Amount used | | 50 mL/min (PROC11) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC11, PROC19) |
| | Exposure duration per day | < 150 min(Critical for: PROC11) |
| | Exposure duration per day | < 15 min(Critical for: PROC19) |
| | Frequency of use | < 240 days/year(except PROC11) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC11) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10) |
| PA100392_001 | 26/100 | EN |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|---|---|
| | Exposed skin areas | Hands and forearms. 1980 cm ² (PROC19) |
| | Exposed skin areas | Whole body (PROC11) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. Room size | 1000 m ³ (PROC11) |
| | | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a, PROC10) | |
| | provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC11) | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Regular inspection and maintenance of equipment and machines. Ensure that the task is not carried out by more than one worker. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Clean equipment and the work area every day. Ensure that the task is not carried out overhead.(PROC11) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: Wear respiratory protection(PROC8a, PROC10) | |
| | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC10, PROC11, PROC13, PROC14, PROC19) | |
| | Wear respiratory protection. (Efficiency: 40 %)(PROC11) | |
| | In case no respiratory protection is used, a LEV with adequate effectiveness is required.(PROC11) | |
| | Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. CEPE spERC 8a.n.v1 has been used to evaluate the exposure for the environment

Workers

PROC11 StoffenManager (inhalation exposure)

PROC11 RISKOFDERM.

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19 ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|-----------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|---|-----|--|------------------------|------|
| PROC2, PROC8a, PROC10, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC2, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14 | --- | Worker - inhalative, long-term - local and systemic. | 25,88mg/m ³ | 0,74 |
| PROC4, PROC8b | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC5, PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,01 |
| PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,35 |
| PROC10 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |
| PROC11 | --- | Worker - inhalative, long-term - local and systemic. | 14,05mg/m ³ | 0,4 |
| PROC11 | --- | Worker - dermal, long-term - systemic | 53,75mg/kg bw/day | 0,51 |
| PROC14 | --- | Worker - dermal, long-term - systemic | 3,43mg/kg bw/day | 0,03 |
| PROC19 | --- | Worker - inhalative, long-term - local and systemic. | 6,47mg/m ³ | 0,18 |
| PROC19 | --- | Worker - dermal, long-term - systemic | 14,14mg/kg bw/day | 0,13 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC11

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC11

Please note that modified version has been used (see exposure estimates).

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Scaling for PROC11 (dermal) <http://www.tno.nl> and search for "riskofderm"
Scaling for PROC11 (inhalation) <https://www.stoffenmanager.nl/default.as>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 9: Uses in coatings

| | |
|----------------------------------|---|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Chemical product category | PC9a: Coatings and paints, thinners, paint removers PC15: Non-metal-surface treatment products PC18: Ink and toners PC31: Polishes and wax blends |
| Environmental Release Categories | ERC8d: Wide dispersive outdoor use of processing aids in open systems |
| Activity | Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including product transfer and preparation, application by brush, spray by hand or similar methods) and equipment cleaning. |

2.1 Contributing scenario controlling environmental exposure for: ERC8d

| | | |
|--|---|--|
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data.Other information | Local freshwater dilution factor:: 10 |
| | Other data.Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 98 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 2 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM | | |
| 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 | Air | Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 95 %) |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | | |

2.2 Contributing scenario controlling consumer exposure for: PC9a: Waterborne wall paint, PC15:

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Waterborne wall paint

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 5 %. |
| | Physical Form (at time of use) | liquid |
| Amount used | | 1,25 kg |
| Frequency and duration of use | Application duration | 120 min |
| | Non spray applications | |
| | Exposure duration per day | 132 min |
| | Frequency of use | 1 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Hands and forearms. 1900 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 20 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,6 |
| | Mass transfer rate | 0,331 m/min |
| | Release area | 10 m ² |
| | Release duration | 7200 sec |

2.3 Contributing scenario controlling consumer exposure for: PC9a: Aerosol spray can, PC15: Aerosol spray can

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 5 %. |
| | Physical Form (at time of use) | liquid |
| Frequency and duration of use | Spray Duration | 15 min |
| | Exposure duration per day | 15 min |
| | Frequency of use | 2 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Hands and forearms. 1900 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 34 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 1,5 |
| | Release duration | 900 sec |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures

Ensure spraying away from persons.

2.4 Contributing scenario controlling consumer exposure for: PC18: Refilling of toners

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 5 %. |
| | Physical Form (at time of use) | liquid |
| Amount used | | 0,05 kg (PC18) |
| Frequency and duration of use | Application duration | 0,3 min |
| | Exposure duration per day | 0,75 min |
| | Frequency of use | 104 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 215 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,5 |
| | Release area | 20 cm ² |
| | Mass transfer rate | 0,331 m/min |

2.5 Contributing scenario controlling consumer exposure for: PC18: Printing Process

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 5 %. |
| | Physical Form (at time of use) | liquid |
| Amount used | | 0,016 kg |
| Frequency and duration of use | Application duration | 600 min |
| | Exposure duration per day | 600 min |
| | Frequency of use | 365 days/year |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 25 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,6 |

2.6 Contributing scenario controlling consumer exposure for: PC31: Polishes, wax / cream (floor, furniture, shoes)

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Concentration of substance in product : 0% - 2,5% |
| | Physical Form (at time of use) | liquid |
| Amount used | Amount used per event | 0,55 kg |
| Frequency and duration of use | Application duration | 900 min |
| | Non spray applications | |
| | Exposure duration per day | 240 min |
| | Frequency of use | 1 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palms of both hands 430 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 58 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,5 |
| | Release area | 22 m ² |
| | Mass transfer rate | 4740 m/min |
| | Release duration | 7200 sec |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. CEPE spERC 8a.n.v1 has been used to evaluate the exposure for the environment

Consumers

ConsExpo 4.1

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|--|---------------------|--|-----------------------|------|
| PC9a: Waterborne wall paint, PC15: Waterborne wall paint | --- | Consumer-inhalative, long-term - local and systemic. | 0,72mg/m ³ | 0,1 |
| PC9a: Waterborne wall paint, PC15: Waterborne wall paint | --- | consumer dermal, long term - systemic | 2,77mg/kg bw/day | 0,05 |
| PC9a: Aerosol | --- | Consumer-inhalative, | 0,26mg/m ³ | 0,04 |

PA100392_001

33/100

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|---|-----|--|-----------------------|--------|
| spray can, PC15: Aerosol spray can | | long-term - local and systemic. | | |
| PC9a: Aerosol spray can, PC15: Aerosol spray can | --- | consumer dermal, long term - systemic | 1,15mg/kg bw/day | 0,02 |
| PC9a: Aerosol spray can, PC15: Aerosol spray can | --- | consumer oral, long term - systemic | 0,13mg/kg bw/day | < 1 |
| PC18: Refilling of toners | --- | Consumer-inhalative, long-term - local and systemic. | --- | < 1 |
| PC18: Refilling of toners | --- | consumer dermal, long term - systemic | 0,008mg/kg bw/day | 0,0002 |
| PC18: Printing Process | --- | Consumer-inhalative, long-term - local and systemic. | 1,29mg/m ³ | 0,18 |
| PC31: Polishes, wax / cream | --- | Consumer-inhalative, long-term - local and systemic. | 3,93mg/m ³ | 0,56 |
| PC31: Polishes, wax / cream | --- | consumer dermal, long term - systemic | 2,12mg/kg bw/day | 0,04 |

Relevant for section 2.5: Dermal exposure is not considered to be relevant.

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

The ConsExpo model has been used to estimate consumer exposures unless otherwise indicated.

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 10: Use in adhesives and sealants

| | |
|----------------------------------|--|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Chemical product category | PC1: Adhesives, sealants |
| Environmental Release Categories | ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix |

2.1 Contributing scenario controlling environmental exposure for: ERC8c

| | | |
|--|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers concentrations up to 0,075% |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data.Other information | Local freshwater dilution factor:: 10 |
| | Other data.Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 15 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM Regional only | | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | | |

2.2 Contributing scenario controlling consumer exposure for: PC1

| | | |
|-------------------------|---|------------------------------------|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers concentrations up to 0,075% |
|-------------------------|---|------------------------------------|

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|---|
| | Physical Form (at time of use) | liquid |
| Amount used | | 9 kg |
| Frequency and duration of use | Application duration | 75 min |
| | Exposure duration | 75 min |
| | Frequency of use | 2 hours/year |
| Human factors not influenced by risk management | Exposed skin areas | Fingers of one hand 110 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 58 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,5 |
| | Covers use under typical household ventilation. | |
| | Mass transfer rate | 4740 m/min |
| | Release area | 4 m ² |
| | Release duration | 4500 sec |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model.

Consumers

ConsExpo 4.1

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|----------------------|-------|
| PC1 | --- | Consumer-inhalative, long-term - local and systemic. | 4,1mg/m ³ | 0,59 |
| PC1 | --- | consumer dermal, long term - systemic | 0,26mg/kg bw/day | 0,005 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
The ConsExpo model has been used to estimate consumer exposures unless otherwise indicated.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 11: Use in Cleaning Agents

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> |
| Environmental Release Categories | ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |
| Activity | Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance. |

2.1 Contributing scenario controlling environmental exposure for: ERC4

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,000011 |
| | Maximum daily site tonnage (kg/day): | 50 kg |
| Frequency and duration of use | Continuous exposure | 220 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 100 % |
| | initial release prior to RMM | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | Emission or Release Factor: Soil | 0 % |
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

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

| | | |
|--|---|---|
| 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) | liquid |
| Amount used | | 600 mL/min (PROC7) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC7) |
| | Exposure duration per day | < 6 h(Critical for: PROC7) |
| | Frequency of use | < 240 days/year(except PROC7) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC7) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC13) |
| | Exposed skin areas | Whole body (PROC7) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. Room size | 1000 m ³ (PROC7) |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7) | |
| | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m). Ensure that the task is not carried out overhead. Ensure control measures are regularly inspected and maintained. | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | |
|---|---|
| Conditions and measures related to personal protection, hygiene and health evaluation | Clean equipment and the work area every day.(PROC7) |
| | Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7) |
| | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13) |
| | If no LEV: Wear respiratory protection(PROC8a) |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. AISE spERC 4.1 has been used to evaluate the exposure for the environment

Workers

PROC7 StoffenManager (inhalation exposure)

PROC7 RISKOFDERM.

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC13 ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC7 | --- | Worker - inhalative, long-term - local and systemic. | 9,79mg/m ³ | 0,28 |
| PROC7 | --- | Worker - dermal, long-term - systemic | 54,6mg/m ³ | 0,52 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC10, PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,87mg/m ³ | 0,74 |
| PROC10 | --- | Worker - dermal, long- | 2,74mg/kg bw/day | 0,03 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| term - systemic |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC7

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC7

Please note that modified version has been used (see exposure estimates).

Scaling for PROC7 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC7 (inhalation) <https://www.stoffenmanager.nl/default.aspx>

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 12: Use in Cleaning Agents

| | |
|----------------------------------|---|
| Main User Groups | SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC10: Roller application or brushing</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p> |
| Environmental Release Categories | ERC8a: Wide dispersive indoor use of processing aids in open systems |
| Activity | Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand). |

2.1 Contributing scenario controlling environmental exposure for: ERC8a

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,00075 |
| | Maximum daily site tonnage (kg/day): | 1580 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 100 % |
| | initial release prior to RMM | |
| | Emission or Release | 0 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|--|
| | Factor: Soil | |
| | initial release prior to RMM Regional only | |
| <p>Technical conditions and measures at process level (source) to prevent release</p> <p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p> <p>Organizational measures to prevent/limit release from the site</p> | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |
| | | |
| <p>2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13</p> | | |
| 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) | liquid |
| Amount used | | 0,05 L/min (PROC11) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC11) |
| | Exposure duration per day | < 150 min(Critical for: PROC11) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC11) |
| | Frequency of use | < 240 days/year(except PROC11) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC13) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10) |
| | Exposed skin areas | Whole body (PROC11) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m3(PROC11) |
| | | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide local exhaust ventilation (LEV). (Efficiency: 80 %)(PROC8a, PROC10) | |
| | Provide extract ventilation to points where emissions occur.(PROC11) | |
| Organisational measures to prevent /limit releases, dispersion and exposure | <p>Ensure that the task is not carried out by more than one worker.</p> <p>Ensure that the task is not carried out overhead.</p> <p>Ensure control measures are regularly inspected and maintained.</p> <p>Clean equipment and the work area every day.(PROC11)</p> | |
| Conditions and measures related to personal protection, hygiene | <p>If no LEV:</p> <p>Wear respiratory protection(PROC8a, PROC10)</p> | |
| PA100392_001 | 43/100 | EN |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC10, PROC11, PROC13)

If no LEV:

Wear respiratory protection. (Efficiency: 40 %)(PROC11)

Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11)

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. AISE spERC 8a.1 has been used to evaluate the exposure for the environment

Workers

PROC11 StoffenManager (inhalation exposure)

PROC11 RISKOFDERM.

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC13 ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a, PROC10 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC2, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b | --- | Worker - inhalative, long-term - local and systemic. | 25,88mg/m ³ | 0,74 |
| PROC4, PROC8b | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC10 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |
| PROC11 | --- | Worker - inhalative, long-term - local and systemic. | 14,05mg/m ³ | 0,4 |
| PROC11 | --- | Worker - dermal, long-term - systemic | 53,75mg/kg bw/day | 0,51 |
| PROC13 | --- | Worker - inhalative, long- | 25,88mg/m ³ | 0,74 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| term - local and systemic. |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC11

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC11

Please note that modified version has been used (see exposure estimates).

Scaling for PROC11 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC11 (inhalation) <https://www.stoffenmanager.nl/default.as>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 13: Use in Cleaning Agents

| | |
|----------------------------------|---|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Chemical product category | PC35: Washing and cleaning products (including solvent based products) |
| Environmental Release Categories | ERC8a: Wide dispersive indoor use of processing aids in open systems |
| Activity | Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products, aerosols, coatings, de-icers, lubricants and air care products. |

2.1 Contributing scenario controlling environmental exposure for: ERC8a

| | | |
|--|---|--|
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,00075 |
| | Maximum daily site tonnage (kg/day): | 1580 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data.Other information | Local freshwater dilution factor:: 10 |
| | Other data.Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 100 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM Regional only | | |
| 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 | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | | |

2.2 Contributing scenario controlling consumer exposure for: PC35: Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)

| | | |
|-------------------------|-----------------------------------|--|
| Product characteristics | Concentration of the Substance in | Concentration of substance in product : 0% - 20% |
|-------------------------|-----------------------------------|--|

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|--------------------------------------|
| | Mixture/Article | |
| | Physical Form (at time of use) | liquid |
| Amount used | Amount used per event | 0,5 kg |
| Frequency and duration of use | Application duration | 0,3 min |
| | Exposure duration per day | 0,75 min |
| | Frequency of use | 104 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 215 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 1 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,5 |
| | Covers use under typical household ventilation. | |
| | Release area | 20 cm ² |
| | Mass transfer rate | 4740 m/min |

2.3 Contributing scenario controlling consumer exposure for: PC35: Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)

| | | |
|---|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Concentration of substance in product: 0% - 4% |
| | Physical Form (at time of use) | liquid |
| Amount used | Amount used per event | 0,4 kg |
| Frequency and duration of use | Application duration | 20 min |
| | Exposure duration per day | 240 min |
| | Frequency of use | 104 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 215 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 58 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,5 |
| | Covers use under typical household ventilation. | |
| | Release area | 10 m ² |
| | Mass transfer rate | 4740 m/min |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

2.4 Contributing scenario controlling consumer exposure for: PC35: Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)

| | | |
|--|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 5 %. |
| | Physical Form (at time of use) | liquid |
| Frequency and duration of use | Application duration | 0,41 min |
| | Exposure duration per day | 60 min |
| | Frequency of use | 365 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Hands and forearms. 1900 cm ² |
| | Indoor use. | |
| Other given operational conditions affecting consumers exposure | Room size | 15 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 2,5 |
| | Covers use under typical household ventilation. | |
| | Release duration | 2,6 sec |
| | Mass generation rate | 0,8 g/sec |
| | Airborne fraction | 0,2 |
| | Weight fraction non-volatile | 0,05 |
| | Density non-volatile | 1,8 g/cm ³ |
| Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene) | Ensure spraying away from persons. | |
| | | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. AISE SPERC 8a.1.a.v1 has been used to evaluate the exposure for the environment

Consumers

ConsExpo 4.1

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-------------------------|---------------------|--|-----------------------|-------|
| PC35: Cleaners, liquids | See section 2.2 | Consumer-inhalative, long-term - local and systemic. | 0,01mg/m ³ | 0,001 |

PA100392_001

48/100

EN

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|--------------------------------|-----------------|--|-----------------------|--------|
| PC35: Cleaners, liquids | See section 2.2 | consumer dermal, long term - systemic | 0,03mg/kg bw/day | 0,0006 |
| PC35: Cleaners, liquids | See section 2.3 | Consumer-inhalative, long-term - local and systemic. | 0,61mg/m ³ | 0,09 |
| PC35: Cleaners, liquids | See section 2.3 | consumer dermal, long term - systemic | 11,7mg/kg bw/day | 0,22 |
| PC35: Cleaners, trigger sprays | --- | Consumer-inhalative, long-term - local and systemic. | --- | < 1 |
| PC35: Cleaners, trigger sprays | --- | consumer dermal, long term - systemic | 0,01mg/kg bw/day | 0,0002 |
| PC35: Cleaners, trigger sprays | --- | consumer oral, long term - systemic | --- | < 1 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

The ConsExpo model has been used to estimate consumer exposures unless otherwise indicated.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 14: Use in agrochemicals

| | |
|----------------------------------|---|
| Main User Groups | SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| Process categories | PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises 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) PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring |
| Environmental Release Categories | ERC8d: Wide dispersive outdoor use of processing aids in open systems |
| Activity | Use as an agrochemical excipient for application by manual or machine spraying, smokes and fogging; including equipment clean-downs and disposal. |

2.1 Contributing scenario controlling environmental exposure for: ERC8d

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 100 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 0 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM Regional only | | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

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

| | |
|--|--|
| Air | No air emission controls required; required removal efficiency is 0%. |
| Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC11, PROC13

| | | |
|--|--|---|
| 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) | liquid |
| Amount used | | 0,05 L/min (PROC11) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC11) |
| | Exposure duration per day | < 150 min(Critical for: PROC11) |
| | Frequency of use | < 240 days/year(except PROC11) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC11) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC9, PROC13) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| | Exposed skin areas | Whole body (PROC11) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m3(PROC11) |
| | | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a) | |
| | provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC11) | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Ensure that the task is not carried out by more than one worker. Ensure that the task is not carried out overhead. Clean equipment and the work area every day. Ensure control measures are regularly inspected and maintained.(PROC11) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: | |
| | Wear respiratory protection(PROC8a) | |
| | Wear respiratory protection. (Efficiency: 40 %)(PROC11) | |
| In case no respiratory protection is used, a LEV with adequate effectiveness is | | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| |
|--|
| required.(PROC11) |
| Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC11, PROC13) |
| Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11) |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ECPA spERC 8d.2.v1 has been used to evaluate the exposure for the environment

Workers

PROC11 StoffenManager (inhalation exposure)

PROC11 RISKOFDERM.

PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC13 ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|------------------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC2, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC4, PROC8b, PROC9, PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,88mg/m ³ | 0,74 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC11 | --- | Worker - inhalative, long-term - local and systemic. | 14,05mg/m ³ | 0,4 |
| PROC11 | --- | Worker - dermal, long-term - systemic | 53,75mg/kg bw/day | 0,51 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC11

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

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC11

Please note that modified version has been used (see exposure estimates).

Scaling for PROC11 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC11 (inhalation) <https://www.stoffenmanager.nl/default.as>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 15: Use as lubricants

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC17: Lubrication at high energy conditions and in partly open process</p> <p>PROC18: Greasing at high energy conditions</p> |
| Environmental Release Categories | ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |
| Activity | Covers the use of formulated lubricants in closed and open systems including transfer operations, operation of machinery/engines and similar articles, reworking on reject articles, equipment maintenance and disposal of wastes. |

2.1 Contributing scenario controlling environmental exposure for: ERC4

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,0001 |
| | Maximum daily site tonnage (kg/day): | 5000 kg |
| Frequency and duration of use | Continuous exposure | 20 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,03 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 0,1 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,1 % |
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |
| | | |
| 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18 | | |
| 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) | liquid |
| Amount used | | 600 mL/min (PROC7) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC7) |
| | Exposure duration per day | < 6 h(Critical for: PROC7) |
| | Frequency of use | < 240 days/year(except PROC7) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC7) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC9, PROC13) |
| | Exposed skin areas | Whole body (PROC7) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10, PROC17, PROC18) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m3(PROC7) |
| | | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7) | |
| | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a, PROC17, PROC18) | |
| Organisational measures to prevent /limit releases, dispersion | Ensure that the task is not carried out overhead. | |
| | Ensure that the task is being carried out outside the breathing zone of a worker | |
| PA100392_001 | 55/100 | EN |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

and exposure

(distance head-product greater than 1m).
Clean equipment and the work area every day.
Ensure control measures are regularly inspected and maintained.(PROC7)

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

Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7)
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13, PROC17, PROC18)
If no LEV:
Wear respiratory protection(PROC8a)

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOG spERC 4.6a.v1 has been used to evaluate the exposure for the environment

Workers

PROC7 StoffenManager (inhalation exposure)
PROC7 RISKOFDERM.
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18
ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-------------------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a, PROC17, PROC18 | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b, PROC9 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC7 | --- | Worker - inhalative, long-term - local and systemic. | 9,79mg/m ³ | 0,28 |
| PROC7 | --- | Worker - dermal, long- | 54,6mg/kg bw/day | 0,52 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | term - systemic | | |
|-------------------|-----|--|------------------------|------|
| PROC8a, PROC18 | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC10, PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,87mg/m ³ | 0,74 |
| PROC10, PROC17 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC7

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Scaling for PROC7 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC7 (inhalation) <https://www.stoffenmanager.nl/default.aspx>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 16: Use as Functional Fluids

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| 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 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) |
| Environmental Release Categories | ERC7: Industrial use of substances in closed systems |
| Activity | Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers. |

2.1 Contributing scenario controlling environmental exposure for: ERC7

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,00001 |
| | Maximum daily site tonnage (kg/day): | 500 kg |
| Frequency and duration of use | Continuous exposure | 20 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 0,1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,1 % |
| initial release prior to RMM Regional only | | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

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

| | |
|--|---|
| Air | No air emission controls required; required removal efficiency is 0%. |
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

| | | |
|--|--|---|
| 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC9) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: | |
| | Wear respiratory protection(PROC8a) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 7.13a.v1 has been used to evaluate the exposure for the environment

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|----------------------------|-----------------------|--------|
| PROC1 | --- | Worker - inhalative, long- | 0,03mg/m ³ | 0,0007 |

PA100392_001

59/100

EN

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|----------------------|-----|--|------------------------|-------|
| | | term - local and systemic. | | |
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b, PROC9 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 17: Use as Functional Fluids

| | |
|----------------------------------|--|
| Main User Groups | SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| 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) PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems |
| Environmental Release Categories | ERC9b: Wide dispersive outdoor use of substances in closed systems |
| Activity | Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers. |

2.1 Contributing scenario controlling environmental exposure for: ERC9b

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 5 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 5 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 5 % |
| initial release prior to RMM Regional only | | |
| Technical conditions and measures at process level | Air | No air emission controls required; required removal |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

(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

| | |
|--|--|
| | efficiency is 0%. |
| Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20

| | | |
|--|--|---|
| 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC9, PROC20) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: | |
| | Wear respiratory protection(PROC8a) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model.

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|-----------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |

PA100392_001

62/100

EN

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|-----------------------|-----|--|------------------------|-------|
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a, PROC20 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC2 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC9 | --- | Worker - inhalative, long-term - local and systemic. | 25,88mg/m ³ | 0,74 |
| PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC20 | --- | Worker - dermal, long-term - systemic | 1,71mg/kg bw/day | 0,02 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 18: Use in heat transfer and hydraulic fluids

| | |
|----------------------------------|---|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Chemical product category | PC16: Heat transfer fluids PC17: Hydraulic fluids |
| Environmental Release Categories | ERC9b: Wide dispersive outdoor use of substances in closed systems |

2.1 Contributing scenario controlling environmental exposure for: ERC9b

| | | |
|--|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Concentration of substance in product : 0% - 30% |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data.Other information | Local freshwater dilution factor:: 10 |
| | Other data.Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 5 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 5 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 5 % |
| initial release prior to RMM Regional only | | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | | |

2.2 Contributing scenario controlling consumer exposure for: PC16, PC17

| | | |
|-------------------------|-----------------------------------|--|
| Product characteristics | Concentration of the Substance in | Concentration of substance in product : 0% - 30% |
|-------------------------|-----------------------------------|--|

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|-------------------------------|
| | Mixture/Article | |
| | Physical Form (at time of use) | Liquid, low fugacity |
| Frequency and duration of use | Exposure duration per day | < 15 min |
| Human factors not influenced by risk management | Exposed skin areas | Two hands 960 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. Assumes activities are at ambient temperature. | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model.

Consumers

Use of ECETOC TRA Version 2 with modifications.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|-----------------------|------|
| PC16, PC17 | --- | Consumer-inhalative, long-term - local and systemic. | 1,93mg/m ³ | 0,28 |
| PC16, PC17 | --- | consumer dermal, long term - systemic | 4,11mg/kg bw/day | 0,08 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 19: Use in laboratories

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | PROC15: Use as laboratory reagent |
| Environmental Release Categories | ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |
| Activity | Use of the substance within laboratory settings, including material transfers and equipment cleaning.. |

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4

| | | |
|--|--|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,0005 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 50 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 50 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM Regional only | | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

2.2 Contributing scenario controlling worker exposure for: 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC15) |
| | Other operational conditions affecting workers exposure | |
| Indoor use. | | |
| Assumes activities are at ambient temperature. | | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model.

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|------------------------|-------|
| PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 20: Use in laboratories

| | |
|----------------------------------|--|
| Main User Groups | SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| Process categories | PROC15: Use as laboratory reagent |
| Environmental Release Categories | ERC8a: Wide dispersive indoor use of processing aids in open systems |
| Activity | Use of small quantities within laboratory settings, including material transfers and equipment cleaning. |

2.1 Contributing scenario controlling environmental exposure for: ERC8a

| | | |
|--|--|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,0005 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 50 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 50 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM Regional only | | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC15

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|---|
| 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC15) |
| | | |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 8.17.v1 has been used to evaluate the exposure for the environment

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|------------------------|-------|
| PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 21: Use in metal working fluids / rolling oils

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC17: Lubrication at high energy conditions and in partly open process</p> |
| Environmental Release Categories | ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |
| Activity | Covers the use in formulated MWFs (MWFs)/rolling oils including transfer operations, rolling and annealing activities, cutting/machining activities, automated and manual application of corrosion protections (including brushing, dipping and spraying), equipment maintenance, draining and disposal of waste oils. |

2.1 Contributing scenario controlling environmental exposure for: ERC4

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,0001 |
| | Maximum daily site tonnage (kg/day): | 5000 kg |
| Frequency and duration of use | Continuous exposure | 20 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,0003 % |
| | initial release prior to RMM | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | Emission or Release Factor: Water | 0,1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |
| | | |
| 2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17 | | |
| 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) | liquid |
| Amount used | | 0,6 L/min (PROC7) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC7) |
| | Exposure duration per day | < 6 h(Critical for: PROC7) |
| | Frequency of use | < 240 days/year(except PROC7) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC7) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC13) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10, PROC17) |
| | Exposed skin areas | Whole body (PROC7) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m ³ (PROC7) |
| | | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7) | |
| | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a, PROC17) | |
| Organisational measures to | Ensure that the task is being carried out outside the breathing zone of a worker | |
| PA100392_001 | 72/100 | EN |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

prevent /limit releases, dispersion and exposure

(distance head-product greater than 1m).
Ensure that the task is not carried out overhead.
Clean equipment and the work area every day.
Ensure control measures are regularly inspected and maintained.(PROC7)

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

If no LEV:
Wear respiratory protection(PROC8a)
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13, PROC17)
Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5)

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 4.7a.v1 has been used to evaluate the exposure for the environment

Workers

PROC1, PROC2, PROC3, PROC8a Used ECETOC TRA model.
PROC7 StoffenManager (inhalation exposure)
PROC7 RISKOFDERM. PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17
ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC5, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC5, PROC8b, PROC9 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC7 | --- | Worker - inhalative, long-term - local and systemic. | 9,79mg/m ³ | 0,28 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|----------------|-----|--|------------------------|------|
| PROC7 | --- | Worker - dermal, long-term - systemic | 54,6mg/kg bw/day | 0,52 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC10, PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,87mg/m ³ | 0,74 |
| PROC10, PROC17 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |
| PROC17 | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC7

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC7

Please note that modified version has been used (see exposure estimates).

Scaling for PROC7 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC7 (inhalation) <https://www.stoffenmanager.nl/default.aspx>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 22: Use in metal working fluids / rolling oils

| | |
|----------------------------------|---|
| Main User Groups | SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC17: Lubrication at high energy conditions and in partly open process</p> |
| Environmental Release Categories | ERC8a: Wide dispersive indoor use of processing aids in open systems |
| Activity | Covers the use in formulated MWFs (MWFs) including transfer operations, open and contained cutting/machining activities, automated and manual application of corrosion protections, draining and working on contaminated/reject articles, and disposal of waste oils. |

2.1 Contributing scenario controlling environmental exposure for: ERC8a

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,0005 |
| | Maximum daily site tonnage (kg/day): | 1370 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 1,5 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 5 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|--|
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 5 % |
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17

| | | |
|--|---|---|
| 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) | liquid |
| Amount used | | 0,05 L/min (PROC11) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC11) |
| | Exposure duration per day | < 150 min(Critical for: PROC11) |
| | Frequency of use | < 240 days/year(except PROC11) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC11) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC5, PROC8b, PROC9, PROC13) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10, PROC17) |
| | Exposed skin areas | Whole body (PROC11) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m3(PROC11) |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a, PROC10) | |
| | provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC11) | |
| | Provide extract ventilation to points where emissions occur. (Efficiency: 90 %)(PROC17) | |
| Organisational measures to | Ensure that the task is not carried out by more than one worker. | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

prevent /limit releases, dispersion and exposure

Ensure that the task is not carried out overhead.
Clean equipment and the work area every day.
Ensure control measures are regularly inspected and maintained.(PROC11)

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

If no LEV:
Wear respiratory protection(PROC8a, PROC10, PROC17)
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC10, PROC11, PROC13, PROC17)
Wear respiratory protection. (Efficiency: 40 %)(PROC11)
In case no respiratory protection is used, a LEV with adequate effectiveness is required.(PROC11)
Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11)

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 8.7c.v1 has been used to evaluate the exposure for the environment

Workers

PROC11 StoffenManager (inhalation exposure)
PROC11 RISKOFDERM.
PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17 ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-------------------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a, PROC10, PROC17 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC2, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC5, PROC8b, PROC9, PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,88mg/m ³ | 0,74 |
| PROC5, PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,01 |
| PROC8b, | --- | Worker - dermal, long- | 6,86mg/kg bw/day | 0,06 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|-------------------|-----|--|------------------------|------|
| PROC9 | | term - systemic | | |
| PROC10, PROC17 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |
| PROC11 | --- | Worker - inhalative, long-term - local and systemic. | 14,05mg/m ³ | 0,4 |
| PROC11 | --- | Worker - dermal, long-term - systemic | 53,75mg/kg bw/day | 0,51 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC11

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC11

Please note that modified version has been used (see exposure estimates).

Scaling for PROC11 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC11 (inhalation) <https://www.stoffenmanager.nl/default.as>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 23: Use in de-icing and anti-icing applications

| | |
|----------------------------------|--|
| Main User Groups | SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| Process categories | PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure 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 PROC11: Non industrial spraying |
| Environmental Release Categories | ERC8d: Wide dispersive outdoor use of processing aids in open systems |
| Activity | Ice prevention and de-icing of vehicles, aircraft and other equipment by spraying. |

2.1 Contributing scenario controlling environmental exposure for: ERC8d

| | | |
|---|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 95 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 4 % |
| initial release prior to RMM | | |
| Technical conditions and measures at process level (source) to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and | Air | Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 0 %) |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

releases to soil
Organizational measures to prevent/limit release from the site

Common practices vary across sites thus conservative process release estimates used.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8a, PROC8b, PROC11

| | | |
|--|--|---|
| 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) | liquid |
| Amount used | | 0,05 L/min (PROC11) |
| | The parameter is relevant for dermal exposure estimates only.(PROC11) | |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC11) |
| | Exposure duration per day | < 150 min(PROC11) |
| | Frequency of use | < 240 days/year(except PROC11) |
| | Frequency of use | 4 - 5 days/week(PROC11) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC8b) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| | Exposed skin areas | Whole body (PROC11) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m3(PROC11) |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 80 %)(PROC8a) | |
| | provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC11) | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Ensure that the task is not carried out by more than one worker. Ensure that the task is not carried out overhead. Clean equipment and the work area every day. Ensure control measures are regularly inspected and maintained.(PROC11) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: Wear respiratory protection(PROC8a) | |
| | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC11) | |
| | Wear respiratory protection. In case no respiratory protection is used, a LEV with adequate effectiveness is required. (Efficiency: 40 %)(PROC11) | |
| | Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC11) | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 8.14a.v1 has been used to evaluate the exposure for the environment

Workers

PROC11 StoffenManager (inhalation exposure)

PROC11 RISKOFDERM.

PROC1, PROC2, PROC8a, PROC8b ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC2 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC8b | --- | Worker - inhalative, long-term - local and systemic. | 25,88mg/m ³ | 0,74 |
| PROC8b | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC11 | --- | Worker - inhalative, long-term - local and systemic. | 14,05mg/m ³ | 0,4 |
| PROC11 | --- | Worker - dermal, long-term - systemic | 53,75mg/kg bw/day | 0,51 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC11

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC11
Please note that modified version has been used (see exposure estimates).
Scaling for PROC11 (dermal) <http://www.tno.nl> and search for "riskofderm"
Scaling for PROC11 (inhalation) <https://www.stoffenmanager.nl/default.as>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 24: Use in de-icing and anti-icing applications

| | |
|----------------------------------|---|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Chemical product category | PC4: Anti-freeze and de-icing products |
| Environmental Release Categories | ERC8d: Wide dispersive outdoor use of processing aids in open systems |
| Activity | De-icing of vehicles and similar equipment by spraying. |

2.1 Contributing scenario controlling environmental exposure for: ERC8d

| | | |
|--|---|--|
| Amount used | Fraction of EU tonnage used in region: | 0,1 |
| | Fraction used at the main local source. | 0,002 |
| | Maximum daily site tonnage (kg/day): | 5479 kg |
| Frequency and duration of use | Continuous exposure | 365 days/year, Dispersive use. |
| Environment factors not influenced by risk management | Other data.Other information | Local freshwater dilution factor:: 10 |
| | Other data.Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 95 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 1 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 4 % |
| initial release prior to RMM | | |
| 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 | Air | Treat air emission to provide a typical removal efficiency of (%): (Efficiency: 0 %) |
| | Water | Estimated substance removal from wastewater via domestic sewage treatment (%): (Degradation effectiveness: 87 %) |
| | | |

2.2 Contributing scenario controlling consumer exposure for: PC4: De-icer

| | | |
|-------------------------|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers the percentage of the substance in the product up to 100 % (unless stated differently). |
| | Physical Form (at time of use) | liquid |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|---|--|
| | | |
| Amount used | | 0,29 g |
| | Non spray applications | |
| Frequency and duration of use | Frequency of use | 365 days/year |
| | Frequency of use | 365 days/year |
| | Frequency of use | 42 sec |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 215 cm ² |
| | Exposed skin areas | Hands and forearms. 1900 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Room size | 58 m ³ |
| | Temperature | 25 °C |
| | Ventilation rate per hour | 0,5 |
| | Covers use under typical household ventilation. | |
| | Release duration | 42 sec |
| | Mass generation rate | 0,78 g/sec |
| | Airborne fraction | 1,0 |
| | Weight fraction non-volatile | 1,0 |
| Density non-volatile | 1,8 g/cm ³ | |
| Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene) | Consumer Measures | Ensure spraying away from persons. |
| | | |

2.3 Contributing scenario controlling consumer exposure for: PC4: Antifreezing agent

| | | |
|---|---|--|
| Product characteristics | Concentration of the Substance in Mixture/Article | Concentration of substance in product : 0% - 30% |
| | Physical Form (at time of use) | liquid |
| Frequency and duration of use | Exposure duration | < 15 min |
| Human factors not influenced by risk management | Exposed skin areas | Two hands 960 cm ² |
| Other given operational conditions affecting consumers exposure | Indoor use. | |
| | Temperature | 25 °C |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC SpERC 8.14b.v1 has been used to evaluate the exposure for the environment

PA100392_001

84/100

EN

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Consumers

ConsExpo 4.1

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|--|-------------------------|------|
| --- | Spraying | Consumer-inhalative, long-term - local and systemic. | 0,0006mg/m ³ | --- |
| --- | Spraying | consumer dermal, long term - systemic | 0,5mg/kg bw/day | --- |
| --- | Spraying | consumer oral, long term - systemic | 0,005mg/kg bw/day | --- |
| --- | cleaning | consumer dermal, long term - systemic | 4,46mg/kg bw/day | --- |
| --- | --- | Worker - inhalative, long-term - local and systemic. | 1,93mg/m ³ | 0,28 |
| --- | --- | Worker - dermal, long-term - systemic | 4,11mg/kg bw/day | 0,08 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 25: Use as water treatment chemicals

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| 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 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 PROC13: Treatment of articles by dipping and pouring |
| Environmental Release Categories | ERC3: Formulation in materials |
| Activity | Covers the use of the substance for the treatment of water at industrial facilities in open and closed systems |

2.1 Contributing scenario controlling environmental exposure for: ERC3

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,00003 |
| | Maximum daily site tonnage (kg/day): | 100 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 5 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 95 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0 % |
| initial release prior to RMM Regional only | | |
| Technical conditions and measures at process level | Air | No air emission controls required; required removal |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

(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

| | |
|-------|---|
| | efficiency is 0%. |
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13

| | | |
|--|--|---|
| 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC8b, PROC13) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | If no LEV: Wear respiratory protection(PROC8a) | |
| | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC13) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOG spERC 3.22a.v1 has been used to evaluate the exposure for the environment

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|-----------------------|---------------------|----------------------------|-----------------------|--------|
| PROC1 | --- | Worker - inhalative, long- | 0,03mg/m ³ | 0,0007 |

PA100392_001

87/100

EN

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|---------------|-----|--|------------------------|-------|
| | | term - local and systemic. | | |
| PROC1, PROC3 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC8b | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,87mg/m ³ | 0,74 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 26: Use in Oil and Gas field drilling and production operations

| | |
|----------------------------------|---|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| 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 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 |
| Environmental Release Categories | ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |
| Activity | Oil field well drilling and production operations (including drilling muds and well cleaning) including material transfers, on-site formulation, well head operations, shaker room activities and related maintenance. |

2.1 Contributing scenario controlling environmental exposure for: ERC4

No exposure assessment presented for the environment.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b

| | | |
|--|---|--|
| 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) | liquid |
| | Vapour pressure | < 0,5 kPa |
| | standard temperature and pressure | |
| Frequency and duration of use | Covers daily exposures up to 8 hours (unless stated differently). | |
| Other operational conditions affecting workers exposure | Assumes use at not more than 20°C above ambient temperature, unless stated differently. | |
| Technical conditions and measures to control dispersion from source towards the worker | Use drum pumps or carefully pour from container.(PROC8b) | |
| | Operation of solids filtering equipment Elevated temperature | Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.(PROC4) |
| | Cleaning of solids filtering equipment | provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC8a) |
| | Treatment and disposal of filtered solids | provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).(PROC3) |
| | Equipment cleaning and maintenance | Drain down system prior to equipment break-in or maintenance.(PROC8a) |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|---|---|
| | Storage | Store substance within a closed system.(PROC1, PROC2) |
| Conditions and measures related to personal protection, hygiene and health evaluation | Filling / preparation of equipment from drums or containers | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.(PROC8b) |
| | Drilling mud (re-)formulation | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.(PROC3) |
| | Drill floor operations | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.(PROC4) |
| | Cleaning of solids filtering equipment | Wear suitable gloves tested to EN374.(PROC8a) |
| | Treatment and disposal of filtered solids | Wear suitable gloves tested to EN374.(PROC3) |
| | Process sampling | Wear suitable gloves tested to EN374.(PROC3) |
| | Pouring from small containers | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.(PROC8a) |
| | Equipment cleaning and maintenance | Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.(PROC8a) |
| | General exposures (open systems) | Wear suitable gloves tested to EN374. |

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Workers

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

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

Environment

No exposure assessment presented for the environment.

Health

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.

Additional good practice advice beyond the REACH Chemical Safety Assessment

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Assumes a good basic standard of occupational hygiene is implemented.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 27: Use as a process chemical

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC15: Use as laboratory reagent</p> |
| Environmental Release Categories | ERC4: Industrial use of processing aids in processes and products, not becoming part of articles |

2.1 Contributing scenario controlling environmental exposure for: ERC4

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,015 |
| | Maximum daily site tonnage (kg/day): | 50000 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 2 % |
| | initial release prior to RMM | |
| | Emission or Release Factor: Water | 0 % |
| | initial release prior to RMM | |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|--|--|---|
| | Emission or Release Factor: Soil | 0,001 % |
| | initial release prior to RMM Regional only | |
| 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 | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, 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) | Liquid, low fugacity |
| Amount used | n.a. in tier 1 TRA MODEL | |
| Frequency and duration of use | Exposure duration per day | < 8 h |
| | Frequency of use | < 240 days/year |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature. | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5, PROC13) | |
| | If no LEV: Wear respiratory protection(PROC8a) | |

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 4.21a.v1 has been used to evaluate the exposure for the environment

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Workers

ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|---|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC5, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC5, PROC8b, PROC9, PROC14, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,87mg/m ³ | 0,74 |
| PROC14 | --- | Worker - dermal, long-term - systemic | 3,43mg/kg bw/day | 0,03 |

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra>

Please note that modified version has been used (see exposure estimates).

Additional good practice advice beyond the REACH Chemical Safety Assessment

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

Use suitable eye protection.

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 28: Other consumer uses

| | |
|----------------------------------|---|
| Main User Groups | SU 21: Consumer uses: Private households (= general public = consumers) |
| Chemical product category | PC28: Perfumes, fragrances PC39: Cosmetics, personal care products |
| Environmental Release Categories | ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems |
| Activity | Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation. |

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

No exposure assessment presented for the environment.

2.2 Contributing scenario controlling consumer exposure for: PC28, PC39

Consumer uses e.g. as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Consumers

No exposure assessment presented for human health

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

No specific advice available

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

1. Short title of Exposure Scenario 29: Polymer production use in foams, in coatings, in adhesives, in sealants.

| | |
|----------------------------------|--|
| Main User Groups | SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process categories | <p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC15: Use as laboratory reagent</p> |
| Environmental Release Categories | ERC6c: Industrial use of monomers for manufacture of thermoplastics |

2.1 Contributing scenario controlling environmental exposure for: ERC6c

| | | |
|---|---|---|
| Product characteristics | Concentration of the Substance in Mixture/Article | Covers percentage substance in the product up to 100 % (unless stated differently). |
| Amount used | Fraction of EU tonnage used in region: | 1 |
| | Fraction used at the main local source. | 0,015 |
| | Maximum daily site tonnage (kg/day): | 50000 kg |
| Frequency and duration of use | Continuous exposure | 300 days/year, Continuous release |
| Environment factors not influenced by risk management | Other data. Other information | Local freshwater dilution factor:: 10 |
| | Other data. Other information | Local marine water dilution factor:: 100 |
| Other given operational conditions affecting environmental exposure | Emission or Release Factor: Air | 0,2 % |
| | initial release prior to RMM | |
| | Emission or Release | 1 % |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | |
|---|--|---|
| | Factor: Water | |
| | initial release prior to RMM | |
| | Emission or Release Factor: Soil | 0,01 % |
| | initial release prior to RMM Regional only | |
| <p>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</p> | Air | No air emission controls required; required removal efficiency is 0%. |
| | Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of (%): (Degradation effectiveness: 87 %) |
| | Common practices vary across sites thus conservative process release estimates used. | |
| | | |
| <p>2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15</p> | | |
| 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) | liquid |
| Amount used | | 0,6 L/min (PROC7) |
| Frequency and duration of use | Exposure duration per day | < 8 h(except PROC7) |
| | Exposure duration per day | < 6 h(Critical for: PROC7) |
| | Frequency of use | < 240 days/year(except PROC7) |
| | Frequency of use | 4 - 5 days/week(Critical for: PROC7) |
| Human factors not influenced by risk management | Exposed skin areas | Palm of one Hand 240 cm ² (PROC1, PROC3, PROC15) |
| | Exposed skin areas | Palms of both hands 480 cm ² (PROC2, PROC4, PROC5, PROC8b, PROC9, PROC13, PROC14) |
| | Exposed skin areas | Whole body (PROC7) |
| | Exposed skin areas | Two hands 960 cm ² (PROC8a, PROC10) |
| Other operational conditions affecting workers exposure | Indoor use. | |
| | Assumes activities are at ambient temperature.Room size | 1000 m ³ (PROC7) |
| | | |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extraction ventilation at points where emissions occur. (Efficiency: 90 %)(PROC8a) | |
| | Provide extraction ventilation at points where emissions occur. (Efficiency: 50 %)(PROC7) | |
| Organisational measures to | Ensure that the task is being carried out outside the breathing zone of a worker | |
| PA100392_001 | 98/100 | EN |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

prevent /limit releases, dispersion and exposure

(distance head-product greater than 1m).
Ensure that the task is not carried out overhead.
Clean equipment and the work area every day.
Ensure control measures are regularly inspected and maintained.(PROC7)

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

If no LEV:
Wear respiratory protection(PROC8a)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training. (Efficiency: 90 %)(PROC5)
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. (Efficiency: 90 %)(PROC7, PROC10, PROC13)
Wear suitable coveralls to prevent exposure to the skin. (Efficiency: 80 %)(PROC7)

3. Exposure estimation and reference to its source

Environment

Used ECETOC TRA model. ESVOC spERC 4.20 v1 has been used to evaluate the exposure for the environment

Workers

PROC7 StoffenManager (inhalation exposure)

PROC7 RISKOFDERM.

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15 ECETOC TRA Version 2 with modifications has been used.

| Contributing Scenario | Specific conditions | Exposure routes | Level of Exposure | RCR |
|---|---------------------|--|------------------------|--------|
| PROC1 | --- | Worker - inhalative, long-term - local and systemic. | 0,03mg/m ³ | 0,0007 |
| PROC1, PROC3, PROC15 | --- | Worker - dermal, long-term - systemic | 0,34mg/kg bw/day | 0,003 |
| PROC2, PROC8a | --- | Worker - inhalative, long-term - local and systemic. | 2,59mg/m ³ | 0,07 |
| PROC2, PROC5, PROC13 | --- | Worker - dermal, long-term - systemic | 1,37mg/kg bw/day | 0,01 |
| PROC3 | --- | Worker - inhalative, long-term - local and systemic. | 7,76mg/m ³ | 0,22 |
| PROC4, PROC5, PROC8b, PROC9, PROC14, PROC15 | --- | Worker - inhalative, long-term - local and systemic. | 12,94mg/m ³ | 0,37 |
| PROC4, PROC8b, PROC9 | --- | Worker - dermal, long-term - systemic | 6,86mg/kg bw/day | 0,06 |
| PROC7 | --- | Worker - inhalative, long- | 9,79mg/m ³ | 0,28 |

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

Monoethylene glycol

Version 2.0

Print Date 28.01.2013

Revision Date 28.01.2013

| | | | | |
|----------------|-----|--|------------------------|------|
| | | term - local and systemic. | | |
| PROC7 | --- | Worker - dermal, long-term - systemic | 54,6mg/m ³ | 0,52 |
| PROC8a | --- | Worker - dermal, long-term - systemic | 13,71mg/kg bw/day | 0,13 |
| PROC10, PROC13 | --- | Worker - inhalative, long-term - local and systemic. | 25,87mg/m ³ | 0,74 |
| PROC10 | --- | Worker - dermal, long-term - systemic | 2,74mg/kg bw/day | 0,03 |
| PROC14 | --- | Worker - dermal, long-term - systemic | 3,43mg/kg bw/day | 0,03 |

The exposure estimate represents the 75th percentile of the exposure distribution. PROC7

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

Environment

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.

Further details on scaling and control technologies are provided in SpERC factsheet (<http://cefic.org/en/reach-for-industries-libraries.html>).

Health

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

For scaling see: <http://www.ecetoc.org/tra> with exception for PROC7

Please note that modified version has been used (see exposure estimates).

Scaling for PROC7 (dermal) <http://www.tno.nl> and search for "riskofderm"

Scaling for PROC7 (inhalation) <https://www.stoffenmanager.nl/default.aspx>

Additional good practice advice beyond the REACH Chemical Safety Assessment

Use suitable eye protection.

| COMPANY INFORMATION DISTRIBUTOR | | |
|--|--|--|
| name | BRENNTAG N.V. | BRENNTAG Nederland B.V. |
| address | Nijverheidslaan 38 8540 Deerlijk | Donker Duyvisweg 44 3316 BM Dordrecht |
| country | Belgium | The Netherlands |
| phone number | +32 (0)56 77 69 44 | +31 (0)78 65 44 944 |
| fax number | +32 (0)56 77 57 11 | +31 (0)78 65 44 919 |
| website | www.brenntag.be | www.brenntag.nl |
| e-mail | info@brenntag.be | info@brenntag.nl |
| activities | Distribution and export of chemicals and raw materials | |
| VAT number | BE0405317567 | NL001375945B01 |
| recall procedure available | Yes | |
| emergency number (24/365) | +32 (0)56 77 69 44 | +31 (0)78 6544 944 |
| QUALITY SYSTEMS | | |
| ISO 9001 | Yes | Yes |
| ISO 14001 | Yes | Yes |
| ISO 22000 | Yes | Yes |
| FSSC 22000 | Yes | Yes |
| GMP+ -feed | Yes | Yes |
| OHSAS18001 | - | Yes |
| ESAD | Yes | Yes |
| other | - | AEO |