# SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
UK REACH Regulations (SI 2019/758 as amended)

**Supercedes date** 15-Dec-2023 **Revision date** 03-Jan-2024 **Revision Number** 7

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

| | |
|---|---|
| **Product Code(s)** | 474 |
| **Safety data sheet number** | 474 |
| **Product Name** | 2-BUTOXYETHANOL |
| **EC No (EU Index No)** | 203-905-0 (603-014-00-0) |
| **CAS No** | 111-76-2 |
| **Synonyms** | BUTYL CELLOSOLVE SOLVENT, BUTYL GLYCOL, BUTYL GLYCOL ETHER, BGE, BG, MS-1, SOLVENT SO228, MUSOL, ADDITIVE NA 101E-CP, WT-1040 |
| **Pure substance/mixture** | Substance |
| Contains 2-BUTOXYETHANOL | |
| **Molecular weight** | 118.2 |

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

| | |
|---|---|
| **Recommended use** | Chemical Cleaning agent Solvent Surface coating Lubricant Water treatment chemical Additive for Agrochemicals For further information, see attached Exposure Scenario |

### 1.3. Details of the supplier of the safety data sheet

**Supplier**
Univar Solutions UK Ltd
Aquarius House
6 Mid Point Business Park
Bradford
GBR

For further information, please contact

| | |
|---|---|
| **E-mail address** | SDS.EMEA@univarsolutions.com |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |

### 1.4. Emergency telephone number

| | |
|---|---|
| Emergency Telephone | SGS - +32 (0)3 575 55 55 (24h) |

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

| | |
|---|---|
| **Acute toxicity - Oral** | Category 4 - (H302) |

| | |
|---|---|
| **Acute toxicity - Inhalation (Vapours)** | Category 4 - (H332) |
| **Skin corrosion/irritation** | Category 2 - (H315) |
| **Serious eye damage/eye irritation** | Category 2 - (H319) |

### 2.2. Label elements

Contains 2-BUTOXYETHANOL

**Signal word**
Warning

**Hazard statements**
H302 - Harmful if swallowed
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H332 - Harmful if inhaled

**Precautionary statements**
P261 - Avoid breathing dust/fume/gas/mist/vapours/spray
P264 - Wash face, hands and any exposed skin thoroughly after handling
P280 - Wear protective gloves and eye/face protection
P312 - Call a POISON CENTER or doctor if you feel unwell
P337 + P313 - If eye irritation persists: Get medical advice/attention
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

**Additional information**
This product requires tactile warnings if supplied to the general public.

### 2.3. Other hazards

The product does not contain any substance(s) classified as PBT or vPvB.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

| Chemical name | Weight-% | EC No (EU Index No) | UK REACH registration number | Classification according to GB CLP (SI 2020/1567 as amended) | Specific concentration limit (SCL) | M-Factor | M-Factor (long-term) |
|---|---|---|---|---|---|---|---|
| 2-BUTOXYETHANOL<br>111-76-2 | 90 - 100% | 203-905-0 (603-014-00-0) | - | Acute Tox. 4 (H302)<br>Acute Tox. 4 (H332)<br>Eye Irrit. 2 (H319)<br>Skin Irrit. 2 (H315) | - | - | - |

**Full text of H- and EUH-phrases: see section 16**

This product does not contain candidate substances of very high concern at a concentration >= 0.1% (UK REACH Article 59)

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

**General advice** Show this safety data sheet to the doctor in attendance.

**Inhalation** Remove to fresh air. Get medical attention immediately if symptoms occur. If symptoms persist, call a doctor. If breathing has stopped, give artificial respiration. Get medical attention immediately.

**Eye contact** Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Get medical attention if irritation develops and persists.

**Skin contact** Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.

**Ingestion** If person is fully conscious give 1 cup or 8 ounces (240 ml) of water. If medical advice is delayed and if an adult has swallowed several ounces of chemical, then give 3-4 ounces (1/3-1/2 Cup) (90-120 ml) of hard liquor such as 80 proof whiskey. For children, give proportionally less liquor at a dose of 0.3 ounce (1 1/2 tsp.) (8 ml) liquor for each 10 pounds of body weight, or 2 ml per kg body weight [e.g., 1.2 ounce (2 1/3 tbsp.) for a 40 pound child or 36 ml for an 18 kg child]. Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Get medical attention.

**Self-protection of the first aider** Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Avoid contact with skin, eyes or clothing. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid breathing vapours or mists. Use personal protective equipment as required. See section 8 for more information.

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

**Symptoms** May cause redness and tearing of the eyes. Burning sensation. Coughing and/ or wheezing. Difficulty in breathing.

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

**Note to doctors** If several ounces (60 - 100 ml) of ethylene glycol have been ingested, early administration of ethanol may counter the toxic effects (metabolic acidosis, renal damage). Consider hemodialysis or peritoneal dialysis & thiamine 100 mg plus pyridoxine 50 mg intravenously every 6 hours. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol: loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG, DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stagecranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. Maintain adequate ventilation and oxygenation of the patient. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination.Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

| | |
|---|---|
| **Suitable Extinguishing Media** | Dry chemical, CO2, alcohol-resistant foam or water spray. |
| **Large Fire** | CAUTION: Use of water spray when fighting fire may be inefficient. |
| **Unsuitable extinguishing media** | Do not scatter spilled material with high pressure water streams. |

**5.2. Special hazards arising from the substance or mixture**

| | |
|---|---|
| **Specific hazards arising from the chemical** | Sealed containers may rupture when heated. |
| **Hazardous combustion products** | May emit toxic fumes under fire conditions. Carbon oxides. Hydrocarbons. |

**5.3. Advice for firefighters**

| | |
|---|---|
| **Special protective equipment and precautions for fire-fighters** | Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Cool containers with flooding quantities of water until well after fire is out. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. |

## SECTION 6: Accidental release measures

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

| | |
|---|---|
| **Personal precautions** | Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Avoid breathing vapours or mists. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear self-contained breathing apparatus. |
| **Other information** | Refer to protective measures listed in Sections 7 and 8. |
| **For emergency responders** | Use personal protection recommended in Section 8. |

**6.2. Environmental precautions**

| | |
|---|---|
| **Environmental precautions** | Avoid release to the environment. |

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

| | |
|---|---|
| **Methods for containment** | Prevent further leakage or spillage if safe to do so. |
| **Methods for cleaning up** | Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. |
| **Prevention of secondary hazards** | Clean contaminated objects and areas thoroughly observing environmental regulations. |

**6.4. Reference to other sections**

| | |
|---|---|
| **Reference to other sections** | See section 8 for more information. See section 13 for more information. |

## SECTION 7: Handling and storage

**7.1. Precautions for safe handling**

| | |
|---|---|
| **Advice on safe handling** | Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash it before reuse. Avoid breathing vapours or mists. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. |
| **General hygiene considerations** | Remove contaminated clothing and protective equipment before entering eating areas. Ensure that eyewash stations and safety showers are close to the workstation location. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing. Wash hands before breaks and |

immediately after handling the product.

### 7.2. Conditions for safe storage, including any incompatibilities

**Storage Conditions** Avoid contact with:. Strong oxidising agents. Strong acids. Strong bases. Suitable containers: carbon steel; stainless steel; phenolic lined steel drums. Unsuitable containers: aluminium, copper, galvanised iron, galvanised steel. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children.

### 7.3. Specific end use(s)

**Specific use(s)**
See section 1 for more information.

**Risk Management Methods (RMM)** The information required is contained in this Safety Data Sheet.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

**Exposure Limits**

| Chemical name | United Kingdom |
|---|---|
| 2-BUTOXYETHANOL<br>111-76-2 | TWA: 123 mg/m³<br>TWA: 25 ppm<br>STEL: 246 mg/m³<br>STEL: 50 ppm |

**Biological occupational exposure limits**

| Chemical name | United Kingdom |
|---|---|
| 2-BUTOXYETHANOL<br>111-76-2 | 240 mmol/mol creatinine - urine (Butoxyacetic acid) - post shift |

**Derived No Effect Level (DNEL) - Workers**

| Chemical name | Oral | Dermal | Inhalation |
|---|---|---|---|
| 2-BUTOXYETHANOL<br>111-76-2 | | 125 mg/kg bw/day [4] [6]<br>89 mg/kg bw/day [4] [7] | 98 mg/m³ [4] [6]<br>1091 mg/m³ [4] [7]<br>246 mg/m³ [5] [7] |

**[4]** Systemic health effects.
**[5]** Local health effects.
**[6]** Long term.
**[7]** Short term.

**Derived No Effect Level (DNEL) - General Public**

| Chemical name | Oral | Dermal | Inhalation |
|---|---|---|---|
| 2-BUTOXYETHANOL<br>111-76-2 | 6.3 mg/kg bw/day [4] [6]<br>26.7 mg/kg bw/day [4] [7] | 89 mg/kg bw/day [4] [6]<br>89 mg/kg bw/day [4] [7] | 59 mg/m³ [4] [6]<br>426 mg/m³ [4] [7]<br>147 mg/m³ [5] [7] |

**[4]** Systemic health effects.
**[5]** Local health effects.
**[6]** Long term.
**[7]** Short term.

**Predicted No Effect Concentration (PNEC)**

| Chemical name | Freshwater | Freshwater (intermittent release) | Marine water | Marine water (intermittent release) | Air |
|---|---|---|---|---|---|
| 2-BUTOXYETHANOL 111-76-2 | 8.8 mg/L | 26.4 mg/L | 0.88 mg/L | | |

| Chemical name | Freshwater sediment | Marine sediment | Sewage treatment | Soil | Food chain |
|---|---|---|---|---|---|
| 2-BUTOXYETHANOL 111-76-2 | 34.6 mg/kg sediment dw | 3.46 mg/kg sediment dw | 463 mg/L | 2.33 mg/kg soil dw | 0.02 g/kg food |

**8.2. Exposure controls**

**Engineering controls** Ensure adequate ventilation. Ensure that eyewash stations and safety showers are close to the workstation location.

**Personal protective equipment**

**Eye/face protection** Wear safety glasses with side shields (or goggles). Use eye protection according to EN 166.

**Hand protection** Gloves must conform to standard EN 374. Ensure that the breakthrough time of the glove material is not exceeded. Refer to glove supplier for information on breakthrough time for specific gloves. Wear suitable gloves. Impervious gloves.

| Gloves | | | |
|---|---|---|---|
| Duration of contact | PPE - Glove material | Glove thickness | Break through time |
| Long term (repeated) | Butyl rubber Polyethylene-Laminate (PE laminate) Neoprene gloves Nitrile rubber | 0.35 mm | 240 minutes |
| Short term | Butyl rubber Polyethylene-Laminate (PE laminate) Neoprene gloves Nitrile rubber | 0.35 mm | 60 minutes |

**Skin and body protection** Wear suitable protective clothing. Long sleeved clothing.

**Respiratory protection** In case of inadequate ventilation or when the product is heated, use suitable respiratory equipment with gas filter (type A2).

**General hygiene considerations** Remove contaminated clothing and protective equipment before entering eating areas. Ensure that eyewash stations and safety showers are close to the workstation location. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing. Wash hands before breaks and immediately after handling the product.

## SECTION 9: Physical and chemical properties

**9.1. Information on basic physical and chemical properties**

**Physical state** Liquid
**Appearance** Liquid
**Colour** Colourless
**Odour** Characteristic.
**Odour threshold** Lower 0.1 ppm, Upper 0.48 ppm

| Property | Values | Remarks • Method |
|---|---|---|
| **Melting point / freezing point** | -70 - -75 °C | No information available. |
| **Initial boiling point and boiling range** | 168 - 172 °C | No information available. |
| **Flammability** | | No information available. |
| **Flammability Limit in Air** | | No information available. |
| **Upper flammability or explosive limits** | 10.6% | |
| **Lower flammability or explosive limits** | 1.3% | |
| **Flash point** | 67 - 67 °C | No information available. |
| **Autoignition temperature** | 230 - 232 °C | No information available. |
| **Decomposition temperature** | | No information available. |
| **pH** | | No information available. |
| **pH (as aqueous solution)** | | No information available. |
| **Kinematic viscosity** | 3.3 - 3.7 mm²/s | @ 20 °C. |
| 2.28 mm²/s | | @ 40 °C. |
| **Dynamic viscosity** | 3.2 - 3.3 mPa s @ 20°C | No information available. |
| **Water solubility** | Miscible in water > 90 g/l | No information available. |
| **Solubility(ies)** | completely soluble Ethanol ACETONE Ether | No information available. |
| **Partition coefficient** | log Pow: 0.81 | No information available. |
| **Vapour pressure** | 0.115 - 0.117 kPa | @ 20 °C. |
| **Relative density** | 0.90 @ 20°C | No information available. |
| **Bulk density** | 899 - 902 kg/m³ | No information available |
| **Liquid Density** | No information available | No information available |
| **Relative vapour density** | 4.1 | No information available. |
| **Particle characteristics** | | No information available. |
| **Particle Size** | No information available | |
| **Particle Size Distribution** | No information available | |
| **Explosive properties** | No information available | |
| **Oxidising properties** | No information available | |

**9.2. Other information**

| | |
|---|---|
| **Molecular weight** | 118.2 |
| **Coefficient Water/Oil Distribution** | log Pow 0.81 89 (diethyl ether = 1) |

## SECTION 10: Stability and reactivity

**10.1. Reactivity**

**Reactivity** The following materials may react with the product:. Strong oxidising agents.

**10.2. Chemical stability**

**Stability** Stable under normal conditions.

**Explosion data**

**Sensitivity to mechanical impact** None.

**Sensitivity to static discharge** None.

**10.3. Possibility of hazardous reactions**

**Possibility of hazardous reactions** Hazardous polymerisation does not occur.

**10.4. Conditions to avoid**

**Conditions to avoid** Do not distill to dryness. Keep away from open flames, hot surfaces and sources of ignition. Excessive heat.

**10.5. Incompatible materials**

**Incompatible materials** Strong acids. Strong bases. Strong oxidising agents.

**10.6. Hazardous decomposition products**

**Hazardous decomposition products** Thermal decomposition can lead to release of irritating and toxic gases and vapours. Carbon oxides. Hydrocarbons.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Information on likely routes of exposure**

**Product Information**

**Inhalation** Harmful by inhalation.

**Eye contact** Causes serious eye irritation.

**Skin contact** Causes skin irritation.

**Ingestion** Harmful if swallowed. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination.

**Symptoms related to the physical, chemical and toxicological characteristics**

**Symptoms** Redness. May cause redness and tearing of the eyes. Coughing and/ or wheezing.

**Acute toxicity**

**Numerical measures of toxicity**

**Component Information**

| Chemical name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|---|---|---|---|
| 2-BUTOXYETHANOL | = 1200 mg/kg (Rat) | > 2000 mg/kg (Rabbit) | = 2,2 mg/l (Rat) 4hr |

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Skin corrosion/irritation** Classification based on data available for ingredients. Causes skin irritation.

**Serious eye damage/eye irritation** Classification based on data available for ingredients. Causes serious eye irritation.

2-BUTOXYETHANOL (111-76-2)

| Method | Species | Exposure route | Effective dose | Exposure time | Results |
|---|---|---|---|---|---|
| OECD 405 | Rabbit | eye | | 24 hours | Irritant |

**Respiratory or skin sensitisation** Not a skin sensitiser.

| Method | Species | Exposure route | Results |
|---|---|---|---|
| | Guinea pig human data | Dermal | Not a skin sensitiser |

**Germ cell mutagenicity** Based on available data the classification criteria are not met.

**Carcinogenicity** Based on available data the classification criteria are not met.

**Reproductive toxicity** Based on available data the classification criteria are not met.

**STOT - single exposure** Based on available data the classification criteria are not met.

**STOT - repeated exposure** Based on available data the classification criteria are not met.

**Aspiration hazard** Based on available data the classification criteria are not met.

**Other adverse effects** No information available.

## SECTION 12: Ecological information

### 12.1. Toxicity

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

2-BUTOXYETHANOL (111-76-2)

| Method | Species | Endpoint type | Effective dose | Exposure time | Results |
|---|---|---|---|---|---|
| OECD Test No. 202: Daphnia sp., Acute Immobilisation Test | Daphnia magna | EC50 | 1550 mg/L | 49 hours | |
| OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test | Pseudokirchneriella subcapitata | EbC50 | 911 mg/L | 72 hours | |
| | Bacteria toxicity | IC50 | > 1000 mg/L | | |
| | Brachydanio rerio | NOEL | > 100 mg/L | 21 days | |
| | Daphnia magna | NOEL | 100 mg/L | 21 days | |

| Chemical name | Algae/aquatic plants | Fish | Toxicity to microorganisms | Crustacea |
|---|---|---|---|---|
| 2-BUTOXYETHANOL | - | LC50: =1490mg/L (96h, Lepomis macrochirus)<br>LC50: =2950mg/L (96h, Lepomis macrochirus) | - | EC50: >1000mg/L (48h, Daphnia magna) |

### 12.2. Persistence and degradability

**Persistence and degradability** Readily biodegradable.

2-BUTOXYETHANOL (111-76-2)

| Method | Exposure time | Value | Results |
|---|---|---|---|
| OECD Test No. 301B: Ready Biodegradability: CO2 Evolution Test (TG 301 B) | 28 days | Biodegradation 90.4% | Readily biodegradable |

### 12.3. Bioaccumulative potential

**Bioaccumulation** Not likely to bioaccumulate.

**Bioconcentration factor (BCF)** 3.2

**Component Information**

| Chemical name | Partition coefficient |
|---|---|
| 2-BUTOXYETHANOL | 0.81 |

### 12.4. Mobility in soil

**Mobility in soil** No information available.

### 12.5. Results of PBT and vPvB assessment

**PBT and vPvB assessment** The product does not contain any substance(s) classified as PBT or vPvB.

| Chemical name | PBT and vPvB assessment |
|---|---|
| 2-BUTOXYETHANOL | The substance is not PBT / vPvB |

**12.6. Other adverse effects**

No information available.

## SECTION 13: Disposal considerations

**13.1. Waste treatment methods**

**Waste from residues/unused products** Waste is classified as hazardous waste. Disposal to licensed waste disposal site in accordance with the local Waste Disposal Authority.

**Contaminated packaging** Do not reuse empty containers.

## SECTION 14: Transport information

**IATA**

**14.1 UN number or ID number** Not regulated
**14.2**
**14.3 Transport hazard class(es)** Not regulated
**14.4 Packing group** Not regulated
**14.5 Environmental hazards** Not applicable
**14.6 Special precautions for user**
**Special Provisions** None

**IMDG**

**14.1 UN number or ID number** Not regulated
**14.3 Transport hazard class(es)** Not regulated
**14.4 Packing group** Not regulated
**14.5 Environmental hazards** Not applicable
**14.6 Special precautions for user**
**Special Provisions** None
**14.7 Maritime transport in bulk according to IMO instruments** No information available

**RID**

**14.1 UN number or ID number** Not regulated
**14.2 UN proper shipping name** Not regulated
**14.3 Transport hazard class(es)** Not regulated
**14.4 Packing group** Not regulated
**14.5 Environmental hazards** Not applicable
**14.6 Special precautions for user**
**Special Provisions** None

**ADR**

**14.1 UN number or ID number** Not regulated
**14.2 UN proper shipping name** Not regulated
**14.3 Transport hazard class(es)** Not regulated
**14.4 Packing group** Not regulated
**14.5 Environmental hazards** Not applicable
**14.6 Special precautions for user**
**Special Provisions** None

## SECTION 15: Regulatory information

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

**National regulations**

**Authorisations and/or restrictions on use:**
This product contains one or more substances subject to restriction (UK REACH - Annex XVII).
This product does not contain substances subject to authorisation (UK REACH - Annex XIV).
**Product restricted per REACH Annex XVII:** 3

**Persistent Organic Pollutants**
Not applicable

**Export Notification requirements**
Not applicable

**Dangerous substance category per COMAH Regulations 2015 (as amended)**
H2 - ACUTE TOXIC

**Named dangerous substances per COMAH Regulations 2015 (as amended)**
Not applicable

**The Ozone-Depleting Substances Regulations 2015**
Not applicable

**The Biocidal Products Regulations 2001 (as amended)**
Not applicable

**The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (as amended)**
Not applicable

**Poisons Act 1972 (Explosive Precursors) Regulations (as Amended)**
Not applicable

**International Inventories**

| | |
|---|---|
| **TSCA** | Contact supplier for inventory compliance status |
| **DSL/NDSL** | Contact supplier for inventory compliance status |
| **EINECS/ELINCS** | Contact supplier for inventory compliance status |
| **ENCS** | Contact supplier for inventory compliance status |
| **IECSC** | Contact supplier for inventory compliance status |
| **KECL** | Contact supplier for inventory compliance status |
| **PICCS** | Contact supplier for inventory compliance status |
| **AIIC** | Contact supplier for inventory compliance status |
| **NZIoC** | Contact supplier for inventory compliance status |

**Legend:**
**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory
**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List
**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
**ENCS** - Japan Existing and New Chemical Substances
**IECSC** - China Inventory of Existing Chemical Substances
**KECL** - Korean Existing and Evaluated Chemical Substances
**PICCS** - Philippines Inventory of Chemicals and Chemical Substances
**AIIC** - Australian Inventory of Industrial Chemicals
**NZIoC** - New Zealand Inventory of Chemicals

**15.2. Chemical safety assessment**

**Chemical Safety Report** A Chemical Safety Assessment has been carried out for this substance

## SECTION 16: Other information

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

**Full text of H-Statements referred to under section 3**
H302 - Harmful if swallowed

H315 - Causes skin irritation
H319 - Causes serious eye irritation
H332 - Harmful if inhaled

**Legend**
SVHC: Substances of Very High Concern for Authorisation:

**Legend Section 8: Exposure controls/personal protection**

| | | | |
|---|---|---|---|
| TWA | TWA (time-weighted average) | STEL | STEL (Short Term Exposure Limit) |
| Ceiling | Maximum limit value | * | Skin designation |
| + | Sensitisers | | |

Revision Note SDS sections updated 2

| Classification procedure | |
|---|---|
| Classification according to Regulation (EC) No. 1272/2008 [CLP] | Method Used |
| Acute oral toxicity | Calculation method |
| Acute dermal toxicity | Calculation method |
| Acute inhalation toxicity - gas | Calculation method |
| Acute inhalation toxicity - vapour | Calculation method |
| Acute inhalation toxicity - dust/mist | Calculation method |
| Skin corrosion/irritation | Calculation method |
| Serious eye damage/eye irritation | Calculation method |
| Respiratory sensitisation | Calculation method |
| Skin sensitisation | Calculation method |
| Mutagenicity | Calculation method |
| Carcinogenicity | Calculation method |
| Reproductive toxicity | Calculation method |
| STOT - single exposure | Calculation method |
| STOT - repeated exposure | Calculation method |
| Acute aquatic toxicity | Calculation method |
| Chronic aquatic toxicity | Calculation method |
| Aspiration hazard | Calculation method |
| Ozone | Calculation method |

**Key literature references and sources for data used to compile the SDS**
Agency for Toxic Substances and Disease Registry (ATSDR)
U.S. Environmental Protection Agency ChemView Database
European Food Safety Authority (EFSA)
European Chemicals Agency (ECHA) Committee for Risk Assessment (ECHA_RAC)
European Chemicals Agency (ECHA) (ECHA_API)
EPA (Environmental Protection Agency)
Acute Exposure Guideline Level(s) (AEGL(s))
U.S. Environmental Protection Agency Federal Insecticide, Fungicide, and Rodenticide Act
U.S. Environmental Protection Agency High Production Volume Chemicals
Food Research Journal
Hazardous Substance Database
International Uniform Chemical Information Database (IUCLID)
National Institute of Technology and Evaluation (NITE)
Australian National Industrial Chemicals Notification and Assessment Scheme (NICNAS)
NIOSH (National Institute for Occupational Safety and Health)
National Library of Medicine's ChemID Plus (NLM CIP)
National Library of Medicine’s PubMed database (NLM PUBMED)
National Toxicology Program (NTP)
New Zealand's Chemical Classification and Information Database (CCID)
Organisation for Economic Co-operation and Development Environment, Health, and Safety Publications
Organisation for Economic Co-operation and Development High Production Volume Chemicals Programme
Organisation for Economic Co-operation and Development Screening Information Data Set
World Health Organization

**Prepared By** J Spenceley

**Supercedes date** 15-Dec-2023

**Revision date** 03-Jan-2024

**This material safety data sheet complies with the requirements of UK REACH Regulations (SI 2019/758 as amended)**
**Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical**

**agents at work**

**Disclaimer**
**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.**

**End of Safety Data Sheet**

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Manufacture of substance |
| **Type** | Worker |
| **Main user group** | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| **Environmental release category(ies)** | ERC1 - Manufacture of substances |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC15 - Use as laboratory reagent |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC1 - Manufacture of substances

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 150000 |
| Units | kg/d |

| | |
|---|---|
| Type | Msafe |
| Value | 6 300 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 300 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; STP) | 87.4% |
| Removal efficiency (total) | 99.8% |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Batch process Process sampling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Storage |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Store substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC15 - Use as laboratory reagent |
| Title | Laboratory activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC1 - Manufacture of substances**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** measured exposure level

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.128 mg/l | 0.017 |
| Freshwater sediment | 0.648 mg/kg | 0.019 |
| Marine water | 0.0129 mg/l | 0.018 |
| Marine sediment | 0.0653 mg/kg | 0.019 |
| Soil | 0.0504 mg/kg | 0.029 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m³ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m³ | 0.001 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.03 mg/kg/day | |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | 0.001 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | 0.005 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.155 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.36 |
| PROC8a - Transfer of substance or preparation (charging/discharging) | Worker - inhalative, long-term - systemic | 10 mg/m³ | 0.5 |

| | | | |
|---|---|---|---|
| from/to vessels/large containers at non dedicated facilities | | | |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.61 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m$^3$ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC15 - Use as laboratory reagent | Worker - inhalative, long-term - systemic | 5 mg/m$^3$ | 0.25 |
| PROC15 - Use as laboratory reagent | Worker - dermal, long-term - systemic | 0.34 mg/kg/day | 0.003 |
| PROC15 - Use as laboratory reagent | Worker - combined, long-term - systemic | | 0.253 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Distribution of substance |
| **Type** | Worker |
| **Main user group** | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| **Environmental release category(ies)** | ERC1 - Manufacture of substances ERC2 - Formulation of preparations (mixtures) |
| **Specific Environmental Release Category** | ESVOC SpERC 1.1b.v1 |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)<br>PROC15 - Use as laboratory reagent |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC1 - Manufacture of substances
- ERC2 - Formulation of preparations (mixtures)
**Specific Environmental Release Category - ESVOC SpERC 1.1b.v1**

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 85000 |
| Units | kg/d |

| | |
|---|---|
| Type | Msafe |
| Value | 1 460 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 300 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment | 2000 m3/day |

| | |
|---|---|
| plant flow | |
| Removal efficiency fraction (offsite; STP) | 87.4% |
| Removal efficiency (total) | 99.8% |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Storage |
| Covers concentrations up to | 100% |

| | |
|---|---|
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Store substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Batch process Process sampling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | General exposures (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| exposure | |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| Title | Drum/batch transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC15 - Use as laboratory reagent |
| Title | Laboratory activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC1 - Manufacture of substances**
**- ERC2 - Formulation of preparations (mixtures)**
**Specific Environmental Release Category - ESVOC SpERC 1.1b.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** measured exposure level

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.0155 mg/l | 0.002 |
| Freshwater sediment | 0.0678 mg/kg | 0.002 |
| Marine water | 0.00168 mg/l | 0.002 |
| Marine sediment | 0.0073 mg/kg | 0.002 |
| Soil | 0.052 mg/kg | 0.030 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m$^3$ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise

indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m³ | 0.001 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.03 mg/kg/day | |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | 0.001 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg | 0.005 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.155 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.8 mg/kg/day | 0.054 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.304 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 10 mg/m³ | 0.5 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg | 0.110 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.61 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |

| | | | |
|---|---|---|---|
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.36 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - dermal, long-term - systemic | 6.8 mg/kg/day | 0.054 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - combined, long-term - systemic | | 0.304 |
| PROC15 - Use as laboratory reagent | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC15 - Use as laboratory reagent | Worker - dermal, long-term - systemic | 0.34 mg/kg/day | 0.003 |
| PROC15 - Use as laboratory reagent | Worker - combined, long-term - systemic | | 0.253 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Distribution of substance |
| **Type** | Worker |
| **Main user group** | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| **Environmental release category(ies)** | ERC2 - Formulation of preparations (mixtures) |
| **Specific Environmental Release Category** | ESVOC SpERC 2.2.v1 |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)<br>PROC15 - Use as laboratory reagent |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC2 - Formulation of preparations (mixtures)
**Specific Environmental Release Category - ESVOC SpERC 2.2.v1**

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 85000 |
| Units | kg/d |

| | |
|---|---|
| Type | Msafe |
| Value | 153 000 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 300 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; STP) | 87.4% |
| Removal efficiency (total) | 99.98% |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Storage |

| | |
|---|---|
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Store substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Batch process Process sampling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | General exposures (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) |
| Title | Mixing operations (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Manual Material transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |

| | |
|---|---|
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC15 - Use as laboratory reagent |
| Title | Laboratory activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Drum/batch transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| Title | Drum and small package filling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC15 - Use as laboratory reagent |
| Title | Laboratory activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC2 - Formulation of preparations (mixtures)**
**Specific Environmental Release Category - ESVOC SpERC 2.2.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** measured exposure level

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 2.81 mg/l | 0.361 |
| Freshwater sediment | >9 mg/kg | 0.390 |
| Marine water | 0.261 mg/l | 0.361 |
| Marine sediment | 1.35 mg/kg | 0.390 |
| Soil | 0.514 mg/kg | 0.297 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m$^3$ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m³ | 0.001 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.03 mg/kg/day | |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | 0.001 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | 0.005 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.155 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | 0.005 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.155 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.8 mg/kg/day | 0.054 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.304 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - dermal, long-term - systemic | 14mg/kg/day | 0.110 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - combined, long-term - systemic | | 0.36 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 10 mg/m³ | 0.5 |

| | | | |
|---|---|---|---|
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.61 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 10 mg/m³ | 0.5 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.61 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.36 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.36 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - dermal, long-term - systemic | 6.8 mg/kg/day | 0.054 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - combined, long-term - systemic | | 0.304 |
| PROC15 - Use as laboratory reagent | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC15 - Use as laboratory reagent | Worker - dermal, long-term - systemic | 0.34 mg/kg/day | 0.003 |
| PROC15 - Use as laboratory reagent | Worker - combined, long-term - systemic | | 0.253 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

**Product Name** BUTYL GLYCOL
**Pure substance/mixture** Substance
**REACH registration number** 01-2119475108-36-XXXX
Supplier Univar Solutions UK Ltd
Aquarius House
6 Mid Point Business Park
Bradford
GBR

Non-Emergency Telephone Number +44 1274 267300 / +44 1274 267306

E-mail address SDS.EMEA@univarsolutions.com

## Section 1 - Title

**Title** Use as an intermediate
**Type** Worker
**Main user group** Industrial uses: Uses of substances as such or in preparations at industrial sites
**Environmental release category(ies)** ERC8a - Wide dispersive indoor use of processing aids in open systems
**Specific Environmental Release Category** ESVOC SpERC 6.1a.v1
**Process category(ies)** 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
**Product Name** BUTYL GLYCOL
**Sector(s) of use** SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC8a - Wide dispersive indoor use of processing aids in open systems
**Specific Environmental Release Category - ESVOC SpERC 6.1a.v1**

**Amounts used**

| Type | Daily amount per site |
|---|---|
| Value | 33333 |
| Units | kg/d |

| Type | Msafe |
|---|---|
| Value | 91 400 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| Type | Continuous release |
|---|---|
| Emission days | 150 |

**Conditions and measures related to municipal sewage treatment plant**

| Assumed domestic sewage treatment plant flow | 2000 m3/day |
|---|---|
| Removal efficiency fraction (offsite; STP) | 87.4% |

| | |
|---|---|
| Removal efficiency (total) | 99.8% |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Storage |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to | Store substance within a closed system |

| | |
|---|---|
| control dispersion from source towards the worker | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Batch process Process sampling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Batch process |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Process sampling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers with local exhaust ventilation |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure material transfers are under containment or extract ventilation Local exhaust ventilation - efficiency of at least 97% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers without local exhaust ventilation |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC15 - Use as laboratory reagent |
| Title | Laboratory activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems**
**Specific Environmental Release Category - ESVOC SpERC 6.1a.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used ECETOC TRA model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.879 mg/l | 0.241 |
| Freshwater sediment | 9.02 mg/kg | 0.261 |
| Marine water | 0.0881 mg/l | 0.241 |

| | | |
|---|---|---|
| Marine sediment | 0.902 mg/kg | 0.261 |
| Soil | 0.0504 mg/kg | 0.029 |

**Derived No Effect Level (DNEL):**

**Worker - dermal, long-term - systemic** 125 mg/kg/day
**Worker - inhalative, long-term - systemic** 98 mg/m³

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m³ | 0.001 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.03 mg/kg/day | |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | 0.001 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | 0.005 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.155 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 5 mg/l | 0.25 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.8mg/kg/day | 0.054 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.304 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 10 mg/m³ | 0.5 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8a - Transfer of substance or preparation (charging/discharging) | Worker - combined, long-term - systemic | | 0.61 |

| | | | |
|---|---|---|---|
| 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 | Worker - inhalative, long-term - systemic | 5 mg/l | 0.25 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.36 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 0.15 mg/m³ | 0.008 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.118 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 14 mg/kg/day | 0.110 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.36 |
| PROC15 - Use as laboratory reagent | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC15 - Use as laboratory reagent | Worker - dermal, long-term - systemic | 0.34 mg/kg/day | 0.003 |
| PROC15 - Use as laboratory reagent | Worker - combined, long-term - systemic | | 0.253 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Use in coatings (Industrial) |
| **Type** | Worker |
| **Main user group** | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| **Environmental release category(ies)** | ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles |
| **Specific Environmental Release Category** | ESVOC SpERC 4.3a.v1 |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)<br>PROC7 - Industrial spraying<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)<br>PROC10 - Roller application or brushing<br>PROC13 - Treatment of articles by dipping and pouring<br>PROC15 - Use as laboratory reagent |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

**Specific Environmental Release Category - ESVOC SpERC 4.3a.v1**

**Amounts used**

| Type | Daily amount per site |
|---|---|
| Value | 47000 |
| Units | kg/d |

| Type | Msafe |
|---|---|
| Value | 1 460 000 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 300 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; STP) | 87.4% |
| Removal efficiency (total) | 99.98% |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Film formation |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a predominantly closed system provided with extract ventilation Local exhaust ventilation - efficiency of at least 90% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Assumes process temperature up to | >100 C |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Mixing operations (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Film formation |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Use ventilation to extract vapours from freshly coated articles/objects and surfaces Local exhaust ventilation - efficiency of at least 90% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) |
| Title | Mixing operations (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC7 - Industrial spraying |
| Title | Machine Spraying |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |

| | |
|---|---|
| Technical conditions and measures to control dispersion from source towards the worker | Carry out in a vented booth or extracted enclosure Efficiency of at least 95% |
| Conditions and measures related to personal protection, hygiene and health evaluation | Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying Wear suitable gloves tested to EN 374 Efficiency of at least 80% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC7 - Industrial spraying |
| Title | Manual spraying |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Carry out in a vented booth or extracted enclosure Efficiency of at least 95% |
| Conditions and measures related to personal protection, hygiene and health evaluation | Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying Wear suitable gloves tested to EN 374 80% Efficiency of at least |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC7 - Industrial spraying |
| Title | Manual spraying |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable respiratory protection (conforming to EN 140 with Type A filter or better) and gloves (type EN 374) if regular skin contact likely Wear a respirator providing a minimum efficiency of 90% Wear suitable gloves tested to EN 374 Efficiency of at least 80% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Material transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Material transfers |
| Covers concentrations up to | 100% |

| | |
|---|---|
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) |
| Title | Drum/batch transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Roller, spreader, flow application |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC13 - Treatment of articles by dipping and pouring |
| Title | Treatment of articles by dipping and pouring |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC15 - Use as laboratory reagent |
| Title | Laboratory activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles**
**Specific Environmental Release Category - ESVOC SpERC 4.3a.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 2.51 mg/l | 0.347 |
| Freshwater sediment | >9 mg/kg | 0.375 |
| Marine water | 0.251 mg/l | 0.347 |
| Marine sediment | 1.3 mg/kg | 0.376 |
| Soil | 1.47 mg/kg | 0.848 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m$^3$ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m$^3$ | 0.001 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.03 mg/kg/day | |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | 0.001 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m$^3$ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 1 mg/m$^3$ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.3 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |
| PROC3 - Use in closed batch process | Worker - inhalative, long-term | 3 mg/m$^3$ | 0.15 |

| | | | |
|---|---|---|---|
| (synthesis or formulation) | - systemic | | |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.07 mg/kg/day | |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.15 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.07 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.25 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - combined, long-term - systemic | | 0.09 |
| PROC7 - Industrial spraying | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC7 - Industrial spraying | Worker - dermal, long-term - systemic | 4.29 mg/kg/day | 0.06 |
| PROC7 - Industrial spraying | Worker - combined, long-term - systemic | | 0.41 |
| PROC7 - Industrial spraying | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC7 - Industrial spraying | Worker - dermal, long-term - systemic | 4.29 mg/kg/day | 0.06 |
| PROC7 - Industrial spraying | Worker - combined, long-term - systemic | | 0.31 |
| PROC7 - Industrial spraying | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC7 - Industrial spraying | Worker - dermal, long-term - systemic | 4.29 mg/kg/day | 0.06 |
| PROC7 - Industrial spraying | Worker - combined, long-term - systemic | | 0.31 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 2 mg/m³ | 0.1 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.14 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 1 mg/m³ | 0.05 |
| PROC8b - Transfer of substance or preparation (charging/discharging) | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |

| | | | |
|---|---|---|---|
| from/to vessels/large containers at dedicated facilities | | | |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.07 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - combined, long-term - systemic | | 0.27 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 5.48 mg/kg/day | 0.07 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.22 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - dermal, long-term - systemic | 2.7 mg/kg/day | 0.04 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - combined, long-term - systemic | | 0.19 |
| PROC15 - Use as laboratory reagent | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC15 - Use as laboratory reagent | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | 0.01 |
| PROC15 - Use as laboratory reagent | Worker - combined, long-term - systemic | | 0.26 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Use in coatings (Professional) |
| **Type** | Worker |
| **Main user group** | Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Environmental release category(ies)** | ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8d - Wide dispersive outdoor use of processing aids in open systems |
| **Specific Environmental Release Category** | ESVOC SpERC 8.3b.v1 |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC10 - Roller application or brushing<br>PROC11 - Non industrial spraying<br>PROC13 - Treatment of articles by dipping and pouring<br>PROC15 - Use as laboratory reagent<br>PROC19 - Hand-mixing with intimate contact and only PPE available |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU22 - Professional uses |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems
**Specific Environmental Release Category - ESVOC SpERC 8.3b.v1**

**Amounts used**

| Type | Daily amount per site |
|---|---|
| Value | 14000 |
| Units | kg/d |

| Type | Msafe |
|---|---|
| Value | 25 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 365 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; STP) | 87.4% |
| Removal efficiency (total) | 87.4% |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Preparation of material for application |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Film formation |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Film formation Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) |
| Title | Mixing operations (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to | No other specific measures identified |

| | |
|---|---|
| control dispersion from source towards the worker | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) |
| Title | Mixing operations (open systems) Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Material transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extract ventilation to points where emissions occur Efficiency of at least 80% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Material transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Material transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Roller, spreader, flow application |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide extract ventilation to points where emissions occur Efficiency of at least 80% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Roller, spreader, flow application Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Manual spraying |
| Covers concentrations up to | 25% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Carry out in a vented booth or extracted enclosure Efficiency of at least 80% |
| Conditions and measures related to personal protection, hygiene and health evaluation | Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying Wear suitable gloves tested to EN 374 Efficiency of at least 80% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Manual spraying Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable respiratory protection (conforming to EN 140 with Type A filter or better) and gloves (type EN 374) if regular skin contact likely Wear a respirator providing a minimum efficiency of 90% Wear suitable gloves tested to EN 374 Efficiency of at least 80% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC13 - Treatment of articles by dipping and pouring |

| | |
|---|---|
| Title | Treatment of articles by dipping and pouring |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC13 - Treatment of articles by dipping and pouring |
| Title | Treatment of articles by dipping and pouring Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC15 - Use as laboratory reagent |
| Title | Laboratory activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No other specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC19 - Hand-mixing with intimate contact and only PPE available |
| Title | Hand application - fingerpaints, pastels, adhesives |
| Covers concentrations up to | 25% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves tested to EN 374 |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC19 - Hand-mixing with intimate contact and only PPE available |
| Title | Hand application - fingerpaints, pastels, adhesives Outdoor use |
| Covers concentrations up to | 25% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards | Ensure operation is undertaken outdoors |

| | |
|---|---|
| the worker | |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves tested to EN 374 |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems - ERC8d - Wide dispersive outdoor use of processing aids in open systems**
**Specific Environmental Release Category - ESVOC SpERC 8.3b.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.0139 mg/l | 0.002 |
| Freshwater sediment | 0.0591 mg/kg | 0.002 |
| Marine water | 0.00151 mg/l | 0.002 |
| Marine sediment | 0.00643 mg/kg | 0.002 |
| Soil | 0.0503 mg/kg | 0.029 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m³ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.001 mg/m³ | 0 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.34 mg/kg/day | |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | 0 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 0.27 mg/kg/day | |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.25 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |

| | | | |
|---|---|---|---|
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 2.7 mg/kg/day | |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.25 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.07 mg/kg/day | |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.15 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.17 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.17 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - combined, long-term - systemic | | 0.19 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - inhalative, long-term - systemic | 4.2 mg/m³ | 0.21 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) | Worker - combined, long-term - systemic | | 0.25 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.15 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC8a - Transfer of substance or | Worker - combined, long-term | | 0.19 |

| | | | |
|---|---|---|---|
| preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | - systemic | | |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 2 mg/m³ | 0.1 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.12 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 7.5 mg/m³ | 0.38 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.42 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 1.64 mg/kg/day | 0.02 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.55 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 10.7 mg/kg/day | 0.14 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.39 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 4.2 mg/m³ | 0.21 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 10.7 mg/kg/day | 0.14 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.35 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - inhalative, long-term - systemic | 2 mg/m³ | 0.1 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - combined, long-term - systemic | | 0.14 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - combined, long-term - systemic | | 0.37 |
| PROC15 - Use as laboratory reagent | Worker - inhalative, long-term - systemic | 5 mg/m³ | 0.25 |
| PROC15 - Use as laboratory reagent | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | 0.01 |
| PROC15 - Use as laboratory reagent | Worker - combined, long-term - systemic | | 0.26 |
| PROC19 - Hand-mixing with intimate contact and only PPE available | Worker - inhalative, long-term - systemic | 3.5 mg/m³ | 0.18 |
| PROC19 - Hand-mixing with intimate contact and only PPE available | Worker - dermal, long-term - systemic | 2.83 mg/kg/day | 0.04 |
| PROC19 - Hand-mixing with intimate | Worker - combined, long-term | | 0.22 |

| | | | |
|---|---|---|---|
| contact and only PPE available | - systemic | | |
| PROC19 - Hand-mixing with intimate contact and only PPE available | Worker - inhalative, long-term - systemic | 3.5 mg/m³ | 0.18 |
| PROC19 - Hand-mixing with intimate contact and only PPE available | Worker - dermal, long-term - systemic | 2.83 mg/kg/day | 0.04 |
| PROC19 - Hand-mixing with intimate contact and only PPE available | Worker - combined, long-term - systemic | | 0.22 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Consumer application of coatings |
| **Type** | Consumer |
| **Main user group** | Consumer uses: Private households (= general public = consumers) |
| **Environmental release category(ies)** | ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8d - Wide dispersive outdoor use of processing aids in open systems |
| **Specific Environmental Release Category** | ESVOC SpERC 8.3c.v1 |
| **Product category(ies)** | PC9a - Coatings and paints, thinners, paint removers |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU21 - Consumer uses |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

**Specific Environmental Release Category - ESVOC SpERC 8.3c.v1**

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Emission days | 365 |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of consumer exposure** | |
|---|---|
| Product categories [PC] | PC9a - Coatings and paints, thinners, paint removers |
| Product (sub) category(ies) | Waterborne latex wall paint |
| Covers concentrations up to | 1.5% |
| Physical form of product | Liquid, vapour pressure > 10 Pa (STP) |
| Amounts used | 2760 g/event |
| Exposure duration | 132 minutes per day |
| Use frequency | Covers use up to 4 days per year |
| Risk management measures | Open windows during application to ensure natural ventilation |
| Use in room with a volume of minimum | 20 m3 |

Product categories [PC] PC9a - Coatings and paints, thinners, paint removers

| | |
|---|---|
| Product (sub) category(ies) | Removers (paint-, glue-, wall paper-, sealant-remover) |
| Covers concentrations up to | 5% |
| Physical form of product | Liquid, vapour pressure > 10 Pa (STP) |
| Amounts used | 491 g/event |
| Exposure duration | 120 minutes per day |
| Use frequency | Covers use up to 3 days per year |
| Risk management measures | Covers use under typical household ventilation. |
| Use in room with a volume of minimum | 20 m3 |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems - ERC8d - Wide dispersive outdoor use of processing aids in open systems**
**Specific Environmental Release Category - ESVOC SpERC 8.3c.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.0139 mg/l | 0.054 |
| Freshwater sediment | 0.0591 mg/kg | 0.047 |
| Marine water | 0.00151 mg/l | 0.058 |
| Marine sediment | 0.00643 mg/kg | 0.051 |
| Soil | 0.0503 mg/kg | 0.282 |

**Derived No Effect Level (DNEL):**

**Calculation method** Risk management measures are based on qualitative risk characterization

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Use in Cleaning Agents (Professional) |
| **Type** | Worker |
| **Main user group** | Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Environmental release category(ies)** | ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8d - Wide dispersive outdoor use of processing aids in open systems |
| **Specific Environmental Release Category** | ESVOC SpERC 8.15.v1 ESVOC SpERC 8.5b.v1 ESVOC SpERC 8.4c.v1 |
| **Process category(ies)** | PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC10 - Roller application or brushing<br>PROC11 - Non industrial spraying<br>PROC13 - Treatment of articles by dipping and pouring |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU22 - Professional uses |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

**Specific Environmental Release Category - ESVOC SpERC 8.15.v1**
**- ESVOC SpERC 8.5b.v1**
**- ESVOC SpERC 8.4c.v1**

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 10000 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 365 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; | 87.4% |

| | |
|---|---|
| STP) | |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |
| Waste treatment methods | All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments. |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Use in contained systems |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Semi-automated process (e.g. semi-automatic application of floor care and maintenance products) |
| Covers concentrations up to | 100% |

| | |
|---|---|
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Semi-automated process (e.g. semi-automatic application of floor care and maintenance products) Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| /limit releases, dispersion and exposure | |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Manual spraying |
| Covers concentrations up to | 25% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure doors and windows are opened |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Ad hoc manual application via trigger sprays, dipping, etc |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure doors and windows are opened |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Cleaning with low-pressure washers |
| Covers concentrations up to | 25% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Cleaning with high-pressure washers |
| Covers concentrations up to | 5% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |

| | |
|---|---|
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Cleaning with high-pressure washers Outdoor use |
| Covers concentrations up to | 5% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear chemically resistant gloves (tested to EN 374) in combination with specific activity training Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC13 - Treatment of articles by dipping and pouring |
| Title | Treatment of articles by dipping and pouring |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems**
**- ERC8d - Wide dispersive outdoor use of processing aids in open systems**
**Specific Environmental Release Category - ESVOC SpERC 8.15.v1**
**- ESVOC SpERC 8.5b.v1**
**- ESVOC SpERC 8.4c.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|

| | | |
|---|---|---|
| Freshwater | 0.000828 mg/l | <0.001 |
| Freshwater sediment | 0.00322 mg/kg | <0.001 |
| Marine water | 0.0000879 mg/l | <0.001 |
| Marine sediment | 0.000342 mg/kg | <0.001 |
| Soil | 0.00180 mg/kg | 0.001 |

**Derived No Effect Level (DNEL):**

**Worker - dermal, long-term - systemic** 125 mg/kg/day
**Worker - inhalative, long-term - systemic** 98 mg/m³

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m³ | 0.25 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.27 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.37 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.17 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.37 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC8a - Transfer of substance or | Worker - combined, long-term | | 0.55 |

| | | | |
|---|---|---|---|
| preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | - systemic | | |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.37 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.57 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.57 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 4.5 mg/m³ | 0.23 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.31 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.006 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.06 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.06 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - combined, long-term - systemic | | 0.39 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Consumer Use in cleaning agents |
| **Type** | Consumer |
| **Main user group** | Consumer uses: Private households (= general public = consumers) |
| **Environmental release category(ies)** | ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8d - Wide dispersive outdoor use of processing aids in open systems |
| **Specific Environmental Release Category** | ESVOC SpERC 8.4c.v1 |
| **Product category(ies)** | PC35 - Washing and cleaning products (including solvent based products) |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU21 - Consumer uses |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems

**Specific Environmental Release Category - ESVOC SpERC 8.4c.v1**

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 548 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 365 |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of consumer exposure** | |
|---|---|
| Product categories [PC] | PC35 - Washing and cleaning products (including solvent based products) |
| Product (sub) category(ies) | Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners) |
| Covers concentrations up to | 7% |
| Physical form of product | Liquid, vapour pressure > 10 Pa (STP) |

| | |
|---|---|
| Amounts used | 35 g/event |
| Exposure duration | minutes per day 10 |
| Use frequency | 1 events per day |
| Use in room with a volume of minimum | 20 m3 |

| Product categories [PC] | PC35 - Washing and cleaning products (including solvent based products) |
|---|---|
| Product (sub) category(ies) | Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners) |
| Covers concentrations up to | 7% |
| Physical form of product | Liquid, vapour pressure > 10 Pa (STP) |
| Amounts used | 35 g/event |
| Exposure duration | minutes per day 10 |
| Use frequency | 1 events per day |
| Use in room with a volume of minimum | 20 m3 |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems - ERC8d - Wide dispersive outdoor use of processing aids in open systems**
**Specific Environmental Release Category - ESVOC SpERC 8.4c.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.0139 mg/l | 0.054 |
| Freshwater sediment | 0.0591 mg/kg | 0.047 |
| Marine water | 0.00151 mg/l | 0.058 |
| Marine sediment | 0.00643 mg/kg | 0.051 |
| Soil | 0.0503 mg/kg | 0.282 |

**Derived No Effect Level (DNEL):**

**Calculation method** Risk management measures are based on qualitative risk characterization

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Oil field drilling and production operations |
| **Type** | Worker |
| **Main user group** | Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Environmental release category(ies)** | ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8d - Wide dispersive outdoor use of processing aids in open systems |
| **Specific Environmental Release Category** | ESVOC SpERC 8.15.v1 ESVOC SpERC 8.5b.v1 ESVOC SpERC 8.4c.v1 |
| **Process category(ies)** | PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC10 - Roller application or brushing<br>PROC11 - Non industrial spraying<br>PROC13 - Treatment of articles by dipping and pouring |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU22 - Professional uses |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems
**Specific Environmental Release Category - ESVOC SpERC 8.15.v1**
**- ESVOC SpERC 8.5b.v1**
**- ESVOC SpERC 8.4c.v1**

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 10000 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 365 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; | 87.4% |

| | |
|---|---|
| STP) | |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |
| Waste treatment methods | All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments. |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Use in contained systems |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Semi-automated process (e.g. semi-automatic application of floor care and maintenance products) |
| Covers concentrations up to | 100% |

| | |
|---|---|
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Semi-automated process (e.g. semi-automatic application of floor care and maintenance products) Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| /limit releases, dispersion and exposure | |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Ad hoc manual application via trigger sprays, dipping, etc |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure doors and windows are opened |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Cleaning with low-pressure washers |
| Covers concentrations up to | 25% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Cleaning with high-pressure washers |
| Covers concentrations up to | 5% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Cleaning with high-pressure washers Outdoor use |
| Covers concentrations up to | 5% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |

| | |
|---|---|
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear chemically resistant gloves (tested to EN 374) in combination with specific activity training Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC13 - Treatment of articles by dipping and pouring |
| Title | Treatment of articles by dipping and pouring |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems**
**- ERC8d - Wide dispersive outdoor use of processing aids in open systems**
**Specific Environmental Release Category - ESVOC SpERC 8.15.v1**
**- ESVOC SpERC 8.5b.v1**
**- ESVOC SpERC 8.4c.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.000828 mg/l | <0.001 |
| Freshwater sediment | 0.00322 mg/kg | <0.001 |
| Marine water | 0.0000879 mg/l | <0.001 |
| Marine sediment | 0.000342 mg/kg | <0.001 |
| Soil | 0.00180 mg/kg | 0.001 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m$^3$ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m³ | 0.25 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.27 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.37 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.17 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.55 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.37 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.57 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |

| | | | |
|---|---|---|---|
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.57 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 4.5 mg/m³ | 0.23 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.31 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.006 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.06 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.06 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - combined, long-term - systemic | | 0.39 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Oil field drilling and production operations |
| **Type** | Worker |
| **Main user group** | Professional uses: Public domain (administration, education, entertainment, services, craftsmen) |
| **Environmental release category(ies)** | ERC8a - Wide dispersive indoor use of processing aids in open systems ERC8d - Wide dispersive outdoor use of processing aids in open systems |
| **Specific Environmental Release Category** | ESVOC SpERC 8.15.v1 ESVOC SpERC 8.5b.v1 ESVOC SpERC 8.4c.v1 |
| **Process category(ies)** | PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC10 - Roller application or brushing<br>PROC11 - Non industrial spraying<br>PROC13 - Treatment of articles by dipping and pouring |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU22 - Professional uses |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC8a - Wide dispersive indoor use of processing aids in open systems
- ERC8d - Wide dispersive outdoor use of processing aids in open systems
**Specific Environmental Release Category - ESVOC SpERC 8.15.v1**
**- ESVOC SpERC 8.5b.v1**
**- ESVOC SpERC 8.4c.v1**

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 10000 |
| Units | kg/d |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 365 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; | 87.4% |

| | |
|---|---|
| STP) | |
| Sludge treatment | Sludge should be incinerated, contained or reclaimed |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Additional good practice advice beyond the REACH Chemical Safety Report | Prevent discharge of undissolved substance to or recover from onsite wastewater Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases A leak prevention plan is needed to prevent low level continual releases Bund storage facilities to prevent soil and water pollution in the event of spillage |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |
| Waste treatment methods | All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments. |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Use in contained systems |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | No specific measures identified |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Semi-automated process (e.g. semi-automatic application of floor care and maintenance products) |
| Covers concentrations up to | 100% |

| | |
|---|---|
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Semi-automated process (e.g. semi-automatic application of floor care and maintenance products) Outdoor use |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| /limit releases, dispersion and exposure | |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Ad hoc manual application via trigger sprays, dipping, etc |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure doors and windows are opened |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC10 - Roller application or brushing |
| Title | Cleaning with low-pressure washers |
| Covers concentrations up to | 25% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Cleaning with high-pressure washers |
| Covers concentrations up to | 5% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC11 - Non industrial spraying |
| Title | Cleaning with high-pressure washers Outdoor use |
| Covers concentrations up to | 5% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Ensure operation is undertaken outdoors |

| | |
|---|---|
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear chemically resistant gloves (tested to EN 374) in combination with specific activity training Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC13 - Treatment of articles by dipping and pouring |
| Title | Treatment of articles by dipping and pouring |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan |
| Conditions and measures related to personal protection, hygiene and health evaluation | Wear suitable gloves (tested to EN 374) and eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC8a - Wide dispersive indoor use of processing aids in open systems**
**- ERC8d - Wide dispersive outdoor use of processing aids in open systems**
**Specific Environmental Release Category - ESVOC SpERC 8.15.v1**
**- ESVOC SpERC 8.5b.v1**
**- ESVOC SpERC 8.4c.v1**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | 0.000828 mg/l | <0.001 |
| Freshwater sediment | 0.00322 mg/kg | <0.001 |
| Marine water | 0.0000879 mg/l | <0.001 |
| Marine sediment | 0.000342 mg/kg | <0.001 |
| Soil | 0.00180 mg/kg | 0.001 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m$^3$ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 0.01 mg/m³ | 0.25 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.27 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.37 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 3 mg/m³ | 0.15 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.17 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.55 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.02 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.37 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.57 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 10.5 mg/m³ | 0.53 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |

| | | | |
|---|---|---|---|
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.57 |
| PROC10 - Roller application or brushing | Worker - inhalative, long-term - systemic | 4.5 mg/m³ | 0.23 |
| PROC10 - Roller application or brushing | Worker - dermal, long-term - systemic | 3.29 mg/kg/day | 0.04 |
| PROC10 - Roller application or brushing | Worker - combined, long-term - systemic | | 0.31 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.006 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.06 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC11 - Non industrial spraying | Worker - inhalative, long-term - systemic | 14 mg/m³ | 0.7 |
| PROC11 - Non industrial spraying | Worker - dermal, long-term - systemic | 4.28 mg/kg/day | 0.06 |
| PROC11 - Non industrial spraying | Worker - combined, long-term - systemic | | 0.76 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - inhalative, long-term - systemic | 7 mg/m³ | 0.35 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - dermal, long-term - systemic | 2.74 mg/kg/day | 0.04 |
| PROC13 - Treatment of articles by dipping and pouring | Worker - combined, long-term - systemic | | 0.39 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Oil field drilling and production operations |
| **Type** | Worker |
| **Main user group** | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| **Environmental release category(ies)** | ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)<br>PROC28 - Manual maintenance (cleaning and repair) of machinery |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 110 |
| Units | kg/d |

| | |
|---|---|
| Type | Annual amount per site |
| Value | 2.2 |
| Units | t(ons)/year |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 20 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; | 87.4% |

| | |
|---|---|
| STP) | |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Technical onsite conditions and measures to reduce or limit discharges, air emissions | Process optimised for efficient use of raw materials |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Filling/preparation of equipment from drums or containers. |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |

| | |
|---|---|
| control dispersion from source towards the worker | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Drilling mud (re-)formulation |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Drill floor operations |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Operation of solids filtering equipment |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) Local exhaust ventilation - efficiency of at least 90% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Disposal of wastes |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Process sampling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Material transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | General exposures (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |

| | |
|---|---|
| control dispersion from source towards the worker | |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC28 - Manual maintenance (cleaning and repair) of machinery |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Storage |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | | 0.041 |
| Freshwater sediment | | 0.066 |
| Marine water | | 0.041 |
| Marine sediment | | 0.066 |
| Soil | | 0.091 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m³ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.381 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.381 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 14.77 mg/m³ | 0.151 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | <0.01 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.156 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.306 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.557 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |

| | | | |
|---|---|---|---|
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.612 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 14.77 mg/m³ | 0.151 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | <0.01 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.156 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - combined, long-term - systemic | | 0.306 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.306 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.049 mg/m³ | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.034mg/kg/day | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | <0.01 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.612 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.306 |
| PROC8a - Transfer of substance or preparation (charging/discharging) | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |

| | | | |
|---|---|---|---|
| from/to vessels/large containers at non dedicated facilities | | | |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.612 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - combined, long-term - systemic | | 0.612 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.049 mg/m³ | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.034mg/kg/day | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | <0.01 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 4.924 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Hydraulic Fracturing |
| **Type** | Worker |
| **Main user group** | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| **Environmental release category(ies)** | ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC28 - Manual maintenance (cleaning and repair) of machinery |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 120 |
| Units | kg/d |

| | |
|---|---|
| Type | Annual amount per site |
| Value | 1.5 |
| Units | t(ons)/year |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 13 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; STP) | 87.4% |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Receiving water dilution (fresh or marine) | 18000 m3/day |
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Technical onsite conditions and measures to reduce or limit discharges, air emissions | Process optimised for efficient use of raw materials |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Mixing operations (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| /limit releases, dispersion and exposure | |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | General exposures (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC28 - Manual maintenance (cleaning and repair) of machinery |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Storage |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | | 0.033 |
| Freshwater sediment | | 0.053 |
| Marine water | | <0.01 |
| Marine sediment | | <0.01 |
| Soil | | <0.01 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m³ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.381 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 14.77 mg/m³ | 0.151 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | <0.01 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.156 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.049 mg/m³ | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.034mg/kg/day | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | <0.01 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |

| | | | |
|---|---|---|---|
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.306 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.612 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - combined, long-term - systemic | | 0.612 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.049 mg/m³ | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.034mg/kg/day | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | <0.01 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 4.924 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).

# Annex to the Safety Data Sheet according to Regulation (EC) No 1907/2006 [REACH]

| | |
|---|---|
| **Product Name** | BUTYL GLYCOL |
| **Pure substance/mixture** | Substance |
| **REACH registration number** | 01-2119475108-36-XXXX |
| Supplier | Univar Solutions UK Ltd<br>Aquarius House<br>6 Mid Point Business Park<br>Bradford<br>GBR |
| Non-Emergency Telephone Number | +44 1274 267300 / +44 1274 267306 |
| E-mail address | SDS.EMEA@univarsolutions.com |

## Section 1 - Title

| | |
|---|---|
| **Title** | Oil field drilling and production operations |
| **Type** | Worker |
| **Main user group** | Industrial uses: Uses of substances as such or in preparations at industrial sites |
| **Environmental release category(ies)** | ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles |
| **Process category(ies)** | PROC1 - Use in closed process, no likelihood of exposure<br>PROC2 - Use in closed, continuous process with occasional controlled exposure<br>PROC3 - Use in closed batch process (synthesis or formulation)<br>PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises<br>PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities<br>PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities<br>PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)<br>PROC28 - Manual maintenance (cleaning and repair) of machinery |
| **Product Name** | BUTYL GLYCOL |
| **Sector(s) of use** | SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites |

## Section 2 - Operational conditions and risk management measures

## Section 2.1 - Control of environmental exposure

**Environmental release category(ies)** - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

**Amounts used**

| | |
|---|---|
| Type | Daily amount per site |
| Value | 22500 |
| Units | kg/d |

| | |
|---|---|
| Type | Annual amount per site |
| Value | 450 |
| Units | t(ons)/year |

**Other operational conditions of use affecting environmental exposure**

| | |
|---|---|
| Type | Continuous release |
| Emission days | 13 |

**Conditions and measures related to municipal sewage treatment plant**

| | |
|---|---|
| Assumed domestic sewage treatment plant flow | 2000 m3/day |
| Removal efficiency fraction (offsite; STP) | 87.4% |

**Environmental factors not influenced by risk management**

| | |
|---|---|
| Receiving water dilution (fresh or marine) | 18000 m3/day |
| Local freshwater dilution factor | 10 |
| Local marine water dilution factor | 100 |

**Risk management measures**

| | |
|---|---|
| Technical onsite conditions and measures to reduce or limit discharges, air emissions | Process optimised for efficient use of raw materials |

**Control measures to prevent releases**

| | |
|---|---|
| Water | Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of 87.4% |
| Soil | not applicable - no direct release to soil |

**Conditions and measures related to external treatment of waste for disposal**

| | |
|---|---|
| Disposal | Dispose of waste product or used containers according to local regulations |

| **Control of worker exposure** | |
|---|---|
| Title | General measures applicable to all activities |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN 374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent/minimise exposures and to report any skin problems that may develop Avoid direct eye contact with product, also via contamination on hands |
| Conditions and measures related to personal protection, hygiene and health evaluation | Use suitable eye protection |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities |
| Title | Bulk transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Drilling mud (re-)formulation |

| | |
|---|---|
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Drill floor operations |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | Operation of solids filtering equipment |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) Local exhaust ventilation - efficiency of at least 90% |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Disposal of wastes |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent | Assumes a good basic standard of occupational hygiene is implemented |

| | |
|---|---|
| /limit releases, dispersion and exposure | |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC3 - Use in closed batch process (synthesis or formulation) |
| Title | Process sampling |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure |
| Title | General exposures (closed systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Handle substance within a closed system Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities |
| Title | Material transfers |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |
| Title | General exposures (open systems) |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC28 - Manual maintenance |

| | |
|---|---|
| | (cleaning and repair) of machinery |
| Title | Equipment cleaning and maintenance |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

| | |
|---|---|
| Process category(ies) | PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure |
| Title | Storage |
| Covers concentrations up to | 100% |
| Physical form of product | Liquid, vapour pressure < 0.5 kPa at STP |
| Use frequency | Covers daily exposures up to 8 hours (unless stated differently). |
| Technical conditions and measures to control dispersion from source towards the worker | Provide a basic standard of general ventilation (1 to 3 air changes per hour) |
| Organisational measures to prevent /limit releases, dispersion and exposure | Assumes a good basic standard of occupational hygiene is implemented |
| Operational conditions | Assumes use at not more than 20°C above ambient temperature, unless stated differently |

## Section 3 - Exposure estimation

**Environmental release category(ies) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles**

**Predicted No Effect Concentration (PNEC)**

| | |
|---|---|
| **Freshwater** | 8.8 mg/l |
| **Freshwater sediment** | 34.6 mg/kg |
| **Marine water** | 0.88 mg/l |
| **Marine sediment** | 3.46 mg/kg |
| **Soil** | 2.33 mg/kg |

**Calculation method** Used EUSES model

| Environment | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|
| Freshwater | | <0.01 |
| Freshwater sediment | | <0.01 |
| Marine water | | <0.01 |
| Marine sediment | | <0.01 |
| Soil | | <0.01 |

**Derived No Effect Level (DNEL):**

| | |
|---|---|
| **Worker - dermal, long-term - systemic** | 125 mg/kg/day |
| **Worker - inhalative, long-term - systemic** | 98 mg/m$^3$ |

**Calculation method** The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated

| Process category(ies) | Exposure route | predicted exposure level | Risk characterisation ratio (RCR) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities | Worker - combined, long-term - systemic | | 0.381 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 14.77 mg/m³ | 0.151 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | <0.01 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.156 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.306 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.557 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.612 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 14.77 mg/m³ | 0.151 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 0.69 mg/kg/day | <0.01 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.156 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |

| | | | |
|---|---|---|---|
| weighing) | | | |
| PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) | Worker - combined, long-term - systemic | | 0.306 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC3 - Use in closed batch process (synthesis or formulation) | Worker - combined, long-term - systemic | | 0.306 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.049 mg/m³ | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.034mg/kg/day | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - combined, long-term - systemic | | <0.01 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.612 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - inhalative, long-term - systemic | 24.62 mg/m³ | 0.251 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - dermal, long-term - systemic | 6.86 mg/kg/day | 0.055 |
| PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises | Worker - combined, long-term - systemic | | 0.306 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities | Worker - combined, long-term - systemic | | 0.612 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - inhalative, long-term - systemic | 49.24 mg/m³ | 0.502 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - dermal, long-term - systemic | 13.71 mg/kg/day | 0.11 |
| PROC28 - Manual maintenance (cleaning and repair) of machinery | Worker - combined, long-term - systemic | | 0.612 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - inhalative, long-term - systemic | 0.049 mg/m³ | <0.01 |
| PROC1 - Use in closed process, no likelihood of exposure | Worker - dermal, long-term - systemic | 0.034mg/kg/day | <0.01 |
| PROC1 - Use in closed process, no | Worker - combined, long-term | | <0.01 |

| | | | |
|---|---|---|---|
| likelihood of exposure | - systemic | | |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - inhalative, long-term - systemic | 4.924 mg/m³ | 0.05 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - dermal, long-term - systemic | 1.37 mg/kg/day | 0.011 |
| PROC2 - Use in closed, continuous process with occasional controlled exposure | Worker - combined, long-term - systemic | | 0.061 |

## Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the applicable consumer reference values when the operational conditions/risk management measures given 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. 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).