SAFETY DATA SHEET

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

Supercedes date 07-Apr-2026 **Revision date** 14-May-2026 **Revision Number** 8

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

1.1. Product identifier

Product Code(s)	1400
Safety data sheet number	1400
Product Name	2-(2-BUTOXYETHOXY)ETHANOL
Index No	603-096-00-8
EC Number	203-961-6
CAS No	112-34-5
Synonyms	2-(2-BUTOXYETHOXY) ETHANOL, DIETHYLENE GLYCOL MONO BUTYL ETHER, EMKANOL BDG, BUTYL CARBITOL, BUTYL DIETHOXOL, BUTYL DIGLYCOL ETHER, BDG, BUTYL CARBITOL SOLVENT
Pure substance/mixture	Substance
Molecular weight	162.2 g/mol

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

Recommended use	Manufacture of substance Formulation & (re)packing of substances and mixtures. Distribution of substance Coatings Washing and cleaning products Metal working fluids / rolling oils, Mining chemicals Lubricant Use in agrochemicals Functional fluids Water Treatment Use in laboratories Cosmetics Personal care Perfumes, fragrances Use in Firefoams Aviation. Use in oil and gas field drilling and production operations Intermediate Industrial use Professional use Consumer use For further information, see attached Exposure Scenario
Uses advised against	Do not use in paint spraying equipment

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

Serious eye damage/eye irritation	Category 2 - (H319)

2.2. Label elements

Signal word
Warning

Hazard statements
H319 - Causes serious eye irritation

Precautionary statements
P264 - Wash skin thoroughly after handling
P280 - Wear eye protection/ face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/attention

2.3. Other hazards

No information available.

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-(2-BUTOXYETHOXY)ETHANOL 112-34-5	>= 99.0 %	203-961-6 (603-096-00-8)	-	Eye Irrit. 2 (H319)	-	-	-

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 First aid personnel should wear appropriate protective equipment during any rescue. Use personal protection recommended in Section 8.

Inhalation IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Rinse mouth thoroughly with water. Get medical attention if symptoms occur.

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. Get medical attention if symptoms occur.

Skin contact IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Get medical attention if symptoms occur.

Ingestion Rinse mouth thoroughly with water. Do not induce vomiting without medical advice. Get medical attention if symptoms occur.

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

Symptoms

Eyes Causes serious eye irritation.

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

Note to doctors 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	When heated and in case of fire, toxic vapours/gases may be formed. Containers can burst violently when heated, due to excess pressure build-up. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids..
Hazardous combustion products	Carbon oxides. Aldehydes. Ketones. Organic Acids.

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. Use personal protection equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	Ensure adequate ventilation. Use personal protection recommended in Section 8. Avoid contact with skin, eyes and inhalation of vapours. Evacuate personnel to safe areas. Keep unnecessary and unprotected personnel from entering. In case of spills, beware of slippery floors and surfaces.
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	See Section 12 for additional Ecological Information.

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. Contain spilled material if possible. Pick up and transfer to properly labelled containers.
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	Ensure adequate ventilation. Use personal protection recommended in Section 8. Avoid contact with skin, eyes and inhalation of vapours. Wash thoroughly after handling. Keep container closed when not in use. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.
General hygiene considerations	Wash hands before breaks and immediately after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep container tightly closed in a dry and well-ventilated place.

Packaging materials Unsuitable container/equipment material. Aluminium. copper. Galvanized iron. Galvanized steel.
Suitable container/equipment material:. stainless steel. Carbon Steel. Phenolic lined steel drums.

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-(2-BUTOXYETHOXY)ETHANOL 112-34-5	TWA: 10 ppm TWA: 67.5 mg/m³ STEL: 15 ppm STEL: 101.2 mg/m³

Biological occupational exposure limits This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

Derived No Effect Level (DNEL) - Workers No information available

Chemical name	Oral	Dermal	Inhalation
2-(2-BUTOXYETHOXY)ETHANOL 112-34-5		83 mg/kg bw/day [4] [6]	67.5 mg/m³ [5] [6] 101.2 mg/m³ [5] [7]

Derived No Effect Level (DNEL) - General Public No information available.

Chemical name	Oral	Dermal	Inhalation
2-(2-BUTOXYETHOXY)ETHANOL 112-34-5	6.25 mg/kg [4] [6]		40.5 mg/m³ [4] [6] 40.5 mg/m³ [5] [6] 60.7 mg/m³ [5] [7]

Predicted No Effect Concentration (PNEC) No information available.

Chemical name	Freshwater	Freshwater (intermittent release)	Marine water	Marine water (intermittent release)	Air
2-(2-BUTOXYETHOXY)ETHANOL 112-34-5	1.1 mg/L	11 mg/L	0.11 mg/L		

Chemical name	Freshwater sediment	Marine sediment	Sewage treatment	Soil	Food chain
2-(2-BUTOXYETHOXY)ETHANOL 112-34-5	4.4 mg/kg sediment dw	0.44 mg/kg sediment dw	200 mg/L	0.32 mg/kg soil dw	56 mg/kg food

8.2. Exposure controls

Engineering controls No information available.

Personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles). Use eye protection according to EN ISO 16321-1.

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

Gloves			
Duration of contact	PPE - Glove material	Glove thickness	Break through time
	Butyl rubber	> 0.35 mm	120 minutes
	Chlorinated polyethylene (CPE)	> 0.35 mm	120 minutes
	Polyethylene (PE)	> 0.35 mm	120 minutes
	Ethyl vinyl alcohol laminate ("EVAL")	> 0.35 mm	120 minutes

Skin and body protection Wear suitable protective clothing.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Recommended filter type: Organic gases and vapours filter conforming to EN 14387. Filter type:. Type A.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state Liquid
Appearance Liquid
Colour Colourless
Odour Mild. To. Characteristic.
Odour threshold No information available

Property	Values	Remarks • Method
Melting point / freezing point	-68.00 °C	Read-across.
Initial boiling point and boiling range	228 233 °C	Read-across.
Flammability		No information available.
Flammability Limit in Air		Read-across.
Upper flammability or explosive limits	24.6%	
Lower flammability or explosive limits	0.85%	

Flash point	> 105 °C	Closed cup. Read-across.
Autoignition temperature	> 210 °C	Read-across.
Decomposition temperature		No information available.
pH	6 - 7	10 g/l @ 20 °C.
pH (as aqueous solution)		No information available.
Kinematic viscosity	5.2 cSt	@ 25 °C. Read-across.
Dynamic viscosity	6 mPa s	@ 20 °C. Read-across.
Water solubility	Miscible with water	
Solubility(ies)		No information available.
Partition coefficient	log Pow: 1.00	
Vapour pressure	2.9 Pa	@ 25 °C. Read-across.
	0.02 hPa	@ 20 °C.
Relative density	0.951 - 0.955	@ 20 °C. Read-across.
Bulk density		No information available
Liquid Density	0.955 g/cm3	@ 20 °C
Relative vapour density	> 1	No information available.
Particle characteristics		Not applicable. liquid.
Particle Size	No information available	
Particle Size Distribution	No information available	
Explosive properties	Not considered to be explosive.	
Oxidising properties	Does not meet the criteria for classification as oxidising	

9.2. Other information

Molecular weight	162.2 g/mol
Evaporation rate	0.01 (n-butyl acetate=1) Read-across

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity No known effects under normal use conditions.

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. Product can oxidise at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Direct heating, dirt, chemical contamination, sunlight, UV or ionising radiation.

10.5. Incompatible materials

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

10.6. Hazardous decomposition products

Hazardous decomposition products Carbon oxides. Aldehydes. Ketones. Organic Acids.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Information on likely routes of exposure

Product Information

Inhalation Inhalation of vapours in high concentration may cause irritation of respiratory system.

Eye contact Causes serious eye irritation.

Skin contact Prolonged contact may cause slight skin irritation with local redness.

Ingestion May cause discomfort if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms

Acute toxicity

Numerical measures of toxicity

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
2-(2-BUTOXYETHOXY)ETHANOL	2410 mg/kg (Mouse)	2764 mg/kg (Rabbit)	-

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

Skin corrosion/irritation Prolonged contact may cause slight skin irritation with local redness.

2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Species	Exposure route	Effective dose	Exposure time	Results
OECD 404	Rabbit	Dermal			Not classified

Serious eye damage/eye irritation Causes serious eye irritation.

2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Species	Exposure route	Effective dose	Exposure time	Results
		eye			Causes serious eye irritation

Respiratory or skin sensitisation Not a skin sensitiser.

2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Species	Exposure route	Results
OECD 406	Guinea pig	Dermal	Not classified

Germ cell mutagenicity Not mutagenic.

Component Information
2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Species	Results
OECD 471 OECD 473 OECD 476 OECD 475	in vitro	Not classified

Carcinogenicity No information available.

Reproductive toxicity In animal studies, did not interfere with reproduction.

2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Species	Results
		In animal studies, did not interfere with reproduction

STOT - single exposure No information available.

STOT - repeated exposure In animals, effects have been reported on the following organs:. Blood. Kidneys. Liver.

Component Information
2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Species	Exposure route	Effective dose	Exposure time	Results
					In animals, effects have been reported on the following organs: Blood Kidney Liver

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 Not considered to be harmful to aquatic life.

2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Species	Endpoint type	Effective dose	Exposure time	Results
OECD Test No. 203: Fish, Acute Toxicity Test or Equivalent.	Lepomis macrochirus	LC50	1300 mg/L	96 hours	
OECD Test No. 202: Daphnia sp., Acute Immobilisation Test or Equivalent.	Daphnia magna	EC50	> 100 mg/L	48 hours	
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth Inhibition Test or Equivalent.	Algae Scenedesmus sp	ErC50	> 100 mg/L	96 hours	
OECD Test No. 201: Freshwater Algae and Cyanobacteria, Growth	Algae Scenedesmus sp	EbC50	> 100 mg/L	96 hours	

Inhibition Test or Equivalent.					
	Bacteria	NOEC	255 mg/L		

12.2. Persistence and degradability

Persistence and degradability Readily biodegradable.

2-(2-BUTOXYETHOXY)ETHANOL (112-34-5)

Method	Exposure time	Value	Results
OECD Test No. 301C: Ready Biodegradability: Modified MITI Test (I) (TG 301 C) or Equivalent.	28 days	Biodegradation 89 - 93%	Readily biodegradable
OECD Test No. 302B: Inherent Biodegradability: Zahn-Wellens/ EVPA Test or Equivalent.	28 days	Biodegradation 100 %	Readily biodegradable

12.3. Bioaccumulative potential

Bioaccumulation Not likely to bioaccumulate.

Component Information

Chemical name	Partition coefficient
2-(2-BUTOXYETHOXY)ETHANOL	1

12.4. Mobility in soil

Mobility in soil Miscible with water.

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-(2-BUTOXYETHOXY)ETHANOL	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 Do not dump into any sewers, on the ground, or into any body of water. This product, when being disposed of in its unused and uncontaminated state should be treated as a hazardous waste according to EC Directive 2008/98/EC, provided it fulfils the criteria listed in Annex III of this directive. Any disposal practices must be in compliance with all national and provincial laws and any municipal or local by-laws governing hazardous waste. For used, contaminated and residual materials additional evaluations may be required. Do not discharge onto the ground or into water courses.

Contaminated packaging Do not reuse empty containers.

SECTION 14: Transport information

IATA

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	No
14.6 Special precautions for user	
Special Provisions	None

IMDG

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	No
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	No
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	No
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).

Chemical name	Restricted substance per REACH Annex XVII	Substance subject to authorisation per REACH Annex XIV
2-(2-BUTOXYETHOXY)ETHANOL - 112-34-5	55, 75.	-

Persistent Organic Pollutants
Not applicable

Export Notification requirements
Not applicable

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
KECI	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
H319 - Causes serious eye irritation

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 8

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)
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)
U.S. 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	Lisa Bland
Supercedes date	07-Apr-2026
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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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	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 ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
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) 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
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
- ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

Amounts used

Type	Daily amount per site
Value	50000
Units	kg/d

Type	Maximum daily site tonnage
Value	2900000
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	300

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite;	87.4%

STP)	
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.
Soil	not applicable - no direct release to soil

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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

Process category(ies)	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Title	General exposures (closed systems) 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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 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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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 transport
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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Transfer via enclosed lines
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Section 3 - Exposure estimation

Environmental release category(ies) - ERC1 - Manufacture of substances
- ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00311 mg/l	0.003
Freshwater sediment	0.0149 mg/kg dw	0.004

Marine water	0.000310 mg/l	0.003
Marine sediment	0.00149 mg/kg dw	0.004
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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/l	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	3.5 mg/l	0.35
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343

PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Formulation & (re)packing of substances and mixtures
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)
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 PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use as laboratory reagent
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)

Amounts used

Type	Daily amount per site
Value	12500
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	300

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal

	wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.
Soil	not applicable - no direct release to soil

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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

Process category(ies)	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Title	General exposures (closed systems) 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	Handle substance within a closed system

control dispersion from source towards the worker	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and	Use suitable eye protection Wear suitable gloves tested to EN 374

health evaluation	
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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
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	Transfer via enclosed lines 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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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 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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Handle substance within a closed system
Conditions and measures related to	Use suitable eye protection

personal protection, hygiene and health evaluation	
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Transfer via enclosed lines Store substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Section 3 - Exposure estimation

Environmental release category(ies) - ERC2 - Formulation of preparations (mixtures)

Predicted No Effect Concentration (PNEC)

- **Freshwater** 1.1 mg/l
- **Freshwater sediment** 4.4 mg/kg dw
- **Marine water** 0.11 mg/l
- **Marine sediment** 0.44 mg/kg dw
- **Soil** 0.32 mg/kg dw
- **Impact on Sewage Treatment** 200 mg/l
- **Food chain** 56 mg/kg
- **Intermittent release** 11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.134 mg/l	0.134
Freshwater sediment	0.607 mg/kg dw	0.152
Marine water	0.0134 mg/l	0.134
Marine sediment	0.0607 mg/kg dw	0.152
Soil	0.0315 mg/kg dw	0.038

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	0.4 mg/l	0.01
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 mg/l	0.35
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
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 ppm	0.3
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 bw/d	0.137
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	3.5 mg/l	0.35
PROC8a - Transfer of substance or preparation (charging/discharging)	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137

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	3 mg/l	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	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)
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 PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15 - Use as laboratory reagent
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)

Amounts used

Type	Daily amount per site
Value	12500
Units	kg/d

Type	Maximum daily site tonnage
Value	1600000
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	300

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment	2000 m3/d

plant flow	
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.
Soil	not applicable - no direct release to soil

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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

Process category(ies)	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Title	General exposures (closed systems) 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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 (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	Transfer via enclosed lines
Conditions and measures related to	Wear suitable gloves tested to EN 374

personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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 (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	Transfer via enclosed lines 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 Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Apply vessel entry procedures including use of forced supplied air Drain down system prior to equipment break-in or maintenance 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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC1 - Use in closed process, no likelihood of 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

Section 3 - Exposure estimation

Environmental release category(ies) - ERC1 - Manufacture of substances - ERC2 - Formulation of preparations (mixtures)

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00415 mg/l	0.004
Freshwater sediment	0.0187 mg/kg dw	0.005
Marine water	0.00178 mg/l	0.018
Marine sediment	0.00805 mg/kg dw	0.002
Soil	0.00529 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	2.0 ppm	0.01
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343

PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	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 bw/d	0.069
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
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 bw/d	0.069
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	3.5 mg/l	0.35
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 bw/d	0.137
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	2.0 ppm	0.01
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Coatings
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 PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC7 - Industrial spraying PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10 - Roller application or brushing PROC13 - Treatment of articles by dipping and pouring PROC15 - Use as laboratory reagent
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	12500
Units	kg/d

Type	Maximum daily site tonnage
Value	6800
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	300

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.
Soil	not applicable - no direct release to soil

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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

Process category(ies)	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Minimise exposure by extracted full enclosure for the operation or equipment Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Preparation of material for application 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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 provided with laminar airflow

Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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 provided with laminar airflow
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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	Bulk transfers (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	Transfer via enclosed lines
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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 (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	Transfer via enclosed lines
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Store substance within a closed system Provide a good standard of general ventilation. Natural ventilation is from doors, windows

the worker	etc. Controlled ventilation means air is supplied or removed by a powered fan
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Material transfers 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.113 mg/l	0.137
Freshwater sediment	0.621 mg/kg dw	0.155
Marine water	0.0113 mg/l	0.137
Marine sediment	0.0621 mg/kg dw	0.155
Soil	0.0367 mg/kg dw	0.044

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic 83 mg/kg bw/d
Worker - inhalative, long-term - local 67.5 mg/m³
Worker - inhalative, short-term - local 101.2 mg/m³
Consumer - oral, long-term - systemic 6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic 40.5 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	2.0 ppm	0.01
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	1 ppm	0.1
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
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 ppm	0.3
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 bw/d	0.137
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	1.45 ppm	0.145
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	8.572 mg/kg bw/d	0.429

PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	1.45 ppm	0.145
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	8.572 mg/kg bw/d	0.429
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.5
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3.5 ppm	0.35
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	5.486 mg/kg bw/d	0.247
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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). Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Coatings
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
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 PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) 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 PROC10 - Roller application or brushing PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring PROC15 - Use as laboratory reagent PROC19 - Hand-mixing with intimate contact and only PPE available
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

Amounts used

Type	Daily amount per site
Value	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	6800
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	365

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.
Soil	not applicable - no direct release to soil

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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
Remarks	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
Conditions and measures related to	Use suitable eye protection

personal protection, hygiene and health evaluation	
Remarks	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	General exposures (closed systems) 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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 Indoor 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Preparation of material for application Indoor 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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	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
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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 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	Provide a good standard of controlled ventilation (10 to 15 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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 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	Provide a good standard of controlled ventilation (10 to 15 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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 Indoor 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 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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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 operation is undertaken outdoors
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 Indoor 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 the worker	Carry out in a vented booth or extracted enclosure Efficiency of at least 90%
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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 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 the worker	Ensure operation is undertaken outdoors
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear a respirator conforming to EN 140 with Type A filter or better Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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	Indoor 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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 Indoor use
Covers concentrations up to	25%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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 the worker	Ensure operation is undertaken outdoors

Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00218 mg/l	0.002
Freshwater sediment	0.00977 mg/kg dw	0.002
Marine water	0.000218 mg/l	< 0.001
Marine sediment	0.000976 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC2 - Use in closed, continuous process with occasional controlled	Worker - inhalative, long-term - systemic	3 ppm	0.3

exposure			
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
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 ppm	0.5
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	3.5 ppm	0.35
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 bw/d	0.137
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.5 ppm	0.45
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	0.9 ppm	0.9
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	3.29 mg/kg bw/d	0.165
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	6.3 ppm	0.63

PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	3.29 mg/kg bw/d	0.165
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	4.2 ppm	0.42
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	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 ERC8b - Wide dispersive indoor use of reactive substances in open systems
Product category(ies)	PC9a - Coatings and paints, thinners, paint removers PC9c - Finger paints
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
- ERC8b - Wide dispersive indoor use of reactive substances in open systems

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 or used sacks/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	3%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 276 g/event
Exposure duration	Avoid carrying out operation for more than 132 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently). 4 times 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]	PC9c - Finger paints
Covers concentrations up to	5%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 100 g/event
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
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 - ERC8b - Wide dispersive indoor use of reactive substances in open systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00252 mg/l	0.003
Freshwater sediment	0.0113 mg/kg dw	0.003
Marine water	0.00251 mg/l	0.003
Marine sediment	0.0113 mg/kg dw	0.003
Soil	0.005 mg/kg dw	0.003

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 mg/m³

Calculation method Risk management measures are based on qualitative risk characterization
Remarks Qualitative approach used to conclude safe use

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Cleaning agent
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 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 PROC7 - Industrial spraying PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC10 - Roller application or brushing PROC13 - Treatment of articles by dipping and pouring
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	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	6800
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	365

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d

Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.
Soil	not applicable - no direct release to soil

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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	Automated process with (semi) closed systems 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Automated process with (semi) closed systems 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Washing and cleaning 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and	Use suitable eye protection Wear suitable gloves tested to EN 374

health evaluation	
Remarks	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	Cleaning with high-pressure washers
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection Wear a respirator conforming to EN 140 with Type A filter or better
Remarks	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	Rolling, brushing Manual
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).

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** 1.1 mg/l
- **Freshwater sediment** 4.4 mg/kg dw
- **Marine water** 0.11 mg/l
- **Marine sediment** 0.44 mg/kg dw
- **Soil** 0.32 mg/kg dw
- **Impact on Sewage Treatment** 200 mg/l
- **Food chain** 56 mg/kg
- **Intermittent release** 11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00226 mg/l	0.004
Freshwater sediment	0.0169 mg/kg dw	0.004
Marine water	0.000225 mg/l	0.004
Marine sediment	0.00169 mg/kg dw	0.004

Soil	0.00761 mg/kg dw	0.009

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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)
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.5
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 bw/d	0.137
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3.5 ppm	0.35
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	5.486 mg/kg bw/d	0.247

PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	2.9 ppm	0.29
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	8.572 mg/kg bw/d	0.429
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	5.0 ppm	0.5
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	5.486 mg/kg bw/d	0.274
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.01 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Cleaning agent
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
Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 - Roller application or brushing PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring
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

Amounts used

Type	Daily amount per site
Value	6800
Units	kg/d

Type	Maximum daily site tonnage
Value	115
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

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d

Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Automated process with (semi) closed systems 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).

Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Manual Surface cleaning
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 Rolling, brushing No 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	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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 Spraying Indoor 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 the worker	Provide a good standard of controlled ventilation (10 to 15 air changes per hour)
Conditions and measures related to	Use suitable eye protection

personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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 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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear a respirator conforming to EN 140 with Type A filter or better Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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	Manual Surface cleaning 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	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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 Rolling, brushing
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Washing and cleaning products (closed systems) 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 the worker	Ensure operation is undertaken outdoors

Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00217 mg/l	0.002
Freshwater sediment	0.00973 mg/kg dw	0.002
Marine water	0.000217 mg/l	0.002
Marine sediment	0.000972 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	1.3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC2 - Use in closed, continuous	Worker - dermal, long-term -	1.37 mg/kg bw/d	0.069

process with occasional controlled exposure	systemic		
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	6 ppm	0.6
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3.5 ppm	0.63
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.165
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	5.2 ppm	0.52
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.428 mg/kg bw/d	0.321
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	2 ppm	0.2
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.428 mg/kg bw/d	0.321
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3.5 ppm	0.63
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.165
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3.5 ppm	0.63
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.165
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3.5 ppm	0.63
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.165

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Cleaning agent
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
Product category(ies)	PC35 - Washing and cleaning products (including solvent based products)
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

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 or used sacks/containers according to local regulations

Control of consumer exposure	
Product categories [PC]	PC35 - Washing and cleaning products (including solvent based products)
Covers concentrations up to	100%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Indoor/Outdoor use	Outdoor use
Operational conditions	Covers use at ambient temperatures

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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00772 mg/l	0.180
Freshwater sediment	0.0349 mg/kg dw	0.204
Marine water	0.000771 mg/l	0.180
Marine sediment	0.0349 mg/kg dw	0.204
Soil	0.006 mg/kg dw	0.010

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 mg/m³

Calculation method Risk management measures are based on qualitative risk characterization
Remarks Qualitative approach used to conclude safe use

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Metal working fluids / rolling oils,
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)	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 PROC7 - Industrial spraying PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 - Roller application or brushing PROC13 - Treatment of articles by dipping and pouring PROC17 - Lubrication at high energy conditions and in partly open process
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	2500
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	365

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Retain drain downs in sealed storage pending disposal or for subsequent recycle Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Metal machining 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 good standard of controlled ventilation (10 to 15 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and	Wear suitable gloves tested to EN 374 Use suitable eye protection

health evaluation	
Remarks	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
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 provided with laminar airflow
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN 140 with Type A/P2 filter or better Use suitable eye protection Wear suitable gloves tested to EN 374

Process category(ies)	PROC10 - Roller application or brushing
Title	Rolling, brushing Manual
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 enhanced general ventilation by mechanical means
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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	Automated metal rolling/forming Elevated temperature
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	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Elevated temperature

Process category(ies)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Semi-automated metal rolling/forming Elevated temperature
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
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Elevated temperature

Process category(ies)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Semi-automated metal rolling/forming
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 controlled ventilation (10 to 15 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Semi-automated metal rolling/forming
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	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Semi-automated metal rolling/forming
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	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Equipment cleaning and maintenance Semi-automated metal rolling/forming

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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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** 1.1 mg/l
- **Freshwater sediment** 4.4 mg/kg dw
- **Marine water** 0.11 mg/l
- **Marine sediment** 0.44 mg/kg dw
- **Soil** 0.32 mg/kg dw
- **Impact on Sewage Treatment** 200 mg/l
- **Food chain** 56 mg/kg
- **Intermittent release** 11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00359 mg/l	0.028

Freshwater sediment	0.126 mg/kg dw	0.032
Marine water	0.000373 mg/l	0.031
Marine sediment	0.0138 mg/kg dw	0.035
Soil	0.00823 mg/kg dw	0.010

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343

PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	3 mg/l	0.45
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.274
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	5.0 ppm	0.5
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	1.45 ppm	0.145
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	8.572 mg/kg bw/d	0.017
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	0.9 ppm	0.35
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.274
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	0.9 ppm	0.35
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.274
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	3 mg/l	0.45
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.274
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	3 mg/l	0.45
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.274
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	3 mg/l	0.45
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.274
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	3 mg/l	0.45
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.274
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069

exposure			

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Metal working fluids / rolling oils,
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
Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC10 - Roller application or brushing PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring PROC17 - Lubrication at high energy conditions and in partly open process PROC19 - Hand-mixing with intimate contact and only PPE available
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

Other operational conditions of use affecting environmental exposure

Emission days	365

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%

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	Prevent discharge of undissolved substance to or recover from onsite wastewater

measures to reduce or limit discharges, air emissions	
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage A leak prevention plan is needed to prevent low level continual releases Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases

Control measures to prevent releases

Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4%

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).

Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Metal machining 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 extract ventilation to points where emissions occur
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Metal machining 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 extract ventilation to points where emissions occur

Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Manual Rolling, brushing 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	Provide extract ventilation to points where emissions occur
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Manual Rolling, brushing without local exhaust ventilation
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	with local exhaust ventilation Elevated temperature
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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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	without local exhaust ventilation
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training

	Wear suitable coveralls to prevent exposure to the skin Wear a respirator conforming to EN 140 with Type A filter or better
Remarks	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
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
Conditions and measures related to personal protection, hygiene and	Use suitable eye protection

health evaluation	
Remarks	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	Mixing operations (open systems) Manual without local exhaust ventilation
Covers concentrations up to	25%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 1 hour
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00218 mg/l	0.002
Freshwater sediment	0.00978 mg/kg dw	0.002
Marine water	0.000218 mg/l	0.002
Marine sediment	0.000977 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	Worker - inhalative, long-term - systemic	3 ppm	0.3

exposure			
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	3 mg/l	0.29
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.274
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	2.9 mg/l	0.29
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	5.84 mg/kg bw/d	0.274
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	4.5 ppm	0.6
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.274
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	0.9 ppm	0.63
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.165
PROC11 - Non industrial spraying	Worker - inhalative, long-term	3.5 ppm	0.35

	- systemic		
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.428 mg/kg bw/d	0.321
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	1.7 ppm	0.17
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.428 mg/kg bw/d	0.321
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	4.2 ppm	0.42
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.274
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - inhalative, long-term - systemic	1.8 ppm	0.18
PROC19 - Hand-mixing with intimate contact and only PPE available	Worker - dermal, long-term - systemic	8.49 mg/kg bw/d	0.424

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Mining chemicals
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 PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact) PROC7 - Industrial spraying PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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	333
Units	kg/d

Type	Maximum daily site tonnage
Value	419
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	300

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment	2000 m3/d

plant flow	
Removal efficiency fraction (offsite; STP)	87.4%

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection

Remarks	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) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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) Elevated temperature
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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	(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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Ion exchange and/or Adsorption process (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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	(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).

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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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	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).
Remarks	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	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l

Marine sediment 0.44 mg/kg dw
Soil 0.32 mg/kg dw
Impact on Sewage Treatment 200 mg/l
Food chain 56 mg/kg
Intermittent release 11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.524 mg/l	0.637
Freshwater sediment	2.89 mg/kg dw	0.723
Marine water	0.0576 mg/l	0.701
Marine sediment	0.318 mg/kg dw	0.795
Soil	0.214 mg/kg dw	0.738

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic 83 mg/kg bw/d
Worker - inhalative, long-term - local 67.5 mg/m³
Worker - inhalative, short-term - local 101.2 mg/m³
Consumer - oral, long-term - systemic 6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic 40.5 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	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
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 ppm	0.3
PROC5 - Mixing or blending in batch processes for formulation of	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137

preparations and articles (multi-stage and/or significant contact)			
PROC5 - Mixing or blending in batch processes for formulation of preparations and articles (multi-stage and/or significant contact)	Worker - inhalative, long-term - systemic	5.0 ppm	0.5
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.01 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.5
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 bw/d	0.137
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.01 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Lubricants
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 ERC7 - Industrial use of substances in closed systems
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC7 - Industrial spraying PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10 - Roller application or brushing PROC13 - Treatment of articles by dipping and pouring PROC17 - Lubrication at high energy conditions and in partly open process PROC18 - Greasing at high energy conditions
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
- ERC7 - Industrial use of substances in closed systems

Amounts used

Type	Daily amount per site
Value	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	47000
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	20

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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).

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
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	Use a sampling system designed to control exposure
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Transfer via enclosed lines Formulate in enclosed or ventilated mixing vessels
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Transfer via enclosed lines
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Transfer via enclosed lines Clear transfer lines prior to de-coupling
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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. Manual
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 drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Filling/preparation of equipment from drums or containers. Machine

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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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)
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 in semi-automated and predominantly enclosed filling lines
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open 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	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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)	PROC18 - Greasing at high energy conditions
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	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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

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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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	Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374 Wear a respirator conforming to EN 140 with Type A filter or better
Remarks	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	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	Transfer via enclosed lines Clear transfer lines prior to de-coupling
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Equipment cleaning and maintenance Elevated temperature
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	Transfer via enclosed lines Clear transfer lines prior to de-coupling

the worker	Provide extract ventilation to material transfer points and other openings
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
- ERC7 - Industrial use of substances in closed systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00252 mg/l	0.002
Freshwater sediment	0.0384 mg/kg dw	0.010
Marine water	0.000251 mg/l	0.008
Marine sediment	0.00384 mg/kg dw	0.010
Soil	0.00612 mg/kg dw	0.007

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5.0 ppm	0.5
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 bw/d	0.137
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	0.75 mg/l	0.29
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	13.71 mg/kg bw/d	0.165
PROC18 - Greasing at high energy	Worker - inhalative, long-term	0.75 mg/l	0.075

conditions	- systemic		
PROC18 - Greasing at high energy conditions	Worker - dermal, long-term - systemic	5.486 mg/kg bw/d	0.274
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	1.74 ppm	0.5
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	6.43 mg/kg bw/d	0.274
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	1.45 ppm	0.145
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	8.572 mg/kg bw/d	0.429
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	2.9 ppm	0.29
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	8.572 mg/kg bw/d	0.429
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5.0 ppm	0.5
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 bw/d	0.137

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Lubricants
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
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10 - Roller application or brushing PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring PROC17 - Lubrication at high energy conditions and in partly open process PROC18 - Greasing at high energy conditions PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems
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

Amounts used

Type	Daily amount per site
Value	0.027
Units	kg/d

Type	Maximum daily site tonnage
Value	9.7
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	200

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%

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

Control measures to prevent releases

Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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).

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
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	Use a sampling system designed to control exposure
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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)	PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems
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).
Remarks	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	Transfer via enclosed lines
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Transfer via enclosed lines Clear transfer lines prior to de-coupling
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Use drum pumps
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	Indoor 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	Provide extract ventilation to points where emissions occur Restrict area of openings to equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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)	PROC18 - Greasing at high energy conditions
Title	Indoor 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	Provide extract ventilation to points where emissions occur Restrict area of openings to equipment
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374
Remarks	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)	PROC17 - Lubrication at high energy conditions and in partly open process
Title	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 the worker	Ensure operation is undertaken outdoors
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374 Wear a respirator conforming to EN 140 with Type A filter or better
Remarks	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	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	Transfer via enclosed lines Clear transfer lines prior to de-coupling Provide extract ventilation to points where emissions occur
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Equipment cleaning and maintenance Elevated temperature
Covers concentrations up to	100%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Technical conditions and measures to control dispersion from source towards the worker	Transfer via enclosed lines Clear transfer lines prior to de-coupling Provide extract ventilation to points where emissions occur
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 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	Provide extract ventilation to points where emissions occur
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Engine lubricant service 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	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	Use suitable eye protection

health evaluation	
Remarks	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	Rolling, brushing Manual 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	Provide extract ventilation to points where emissions occur
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Rolling, brushing Manual without local exhaust ventilation
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
Remarks	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	Spraying with local exhaust ventilation
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 90%
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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	Spraying without local exhaust ventilation
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	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training

health evaluation	Use suitable eye protection Wear a respirator conforming to EN 140 with Type A filter or better
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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	Ensure dedicated sample points are provided

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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00218 mg/l	0.002
Freshwater sediment	0.00977 mg/kg dw	0.002
Marine water	0.000218 mg/l	0.002
Marine sediment	0.000976 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³

Consumer - oral, long-term - systemic 6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic 40.5 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 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems	Worker - dermal, long-term - systemic	1.71 mg/kg bw/d	0.086
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 mg/l	0.63
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 bw/d	0.137
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	2.9 mg/l	0.29
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC18 - Greasing at high energy conditions	Worker - inhalative, long-term - systemic	2.9 ppm	0.29

PROC18 - Greasing at high energy conditions	Worker - dermal, long-term - systemic	5.486 mg/kg bw/d	0.274
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - inhalative, long-term - systemic	2.9 mg/l	0.29
PROC17 - Lubrication at high energy conditions and in partly open process	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
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 bw/d	0.137
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	4.2 ppm	0.42
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	6.0 ppm	0.3
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.274
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	6.0 ppm	0.3
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.274
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	1.7 ppm	0.17
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.428 mg/kg bw/d	0.321
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	1.2 ppm	0.12
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.428 mg/kg bw/d	0.321
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	6 ppm	0.6
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137

PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.01 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Lubricants
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
Product category(ies)	PC24 - Lubricants, greases, release products
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

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

Risk management measures

Additional good practice advice beyond the REACH Chemical Safety Report	A leak prevention plan is needed to prevent low level continual releases Site should have a spill plan to ensure that adequate safeguards are in place to minimise the impact of episodic releases

Control measures to prevent releases

Water	Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of consumer exposure

Product categories [PC]	PC24 - Lubricants, greases, release products
Product (sub) category(ies)	Liquids
Covers concentrations up to	10%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 2.2 kg
Exposure duration	Avoid carrying out operation for more than 10.2 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently). Covers use up to 4 times per year
Use in room with a volume of minimum	> 34 m3
Operational conditions	Covers use under typical household ventilation.

Product categories [PC]	PC24 - Lubricants, greases, release products
Product (sub) category(ies)	Pastes
Covers concentrations up to	10%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 0.034 kg
Use frequency	Covers daily exposures up to 8 hours (unless stated differently). Covers use up to 10 times per year

Product categories [PC]	PC24 - Lubricants, greases, release products
Product (sub) category(ies)	Sprays
Covers concentrations up to	3%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 0.03 kg
Exposure duration	Avoid carrying out operation for more than 10.2 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently). Covers use up to 6 times per year
Use in room with a volume of minimum	20 m3
Operational conditions	Covers use under typical household ventilation.

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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00217 mg/l	0.002
Freshwater sediment	0.00974 mg/kg dw	0.002
Marine water	0.000217 mg/l	0.002
Marine sediment	0.000973 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 mg/m³

Calculation method	Risk management measures are based on qualitative risk characterization
Remarks	Qualitative approach used to conclude safe use

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in agrochemicals
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
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC11 - Non industrial spraying PROC13 - Treatment of articles by dipping and pouring
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

Amounts used

Type	Daily amount per site
Value	0.054
Units	kg/d

Type	Maximum daily site tonnage
Value	29
Units	kg/d

Other operational conditions of use affecting environmental exposure

Emission days	365

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment	2000 m3/d

plant flow	
Removal efficiency fraction (offsite; STP)	87.4%

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

Control measures to prevent releases

Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87.4% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Mixing operations (open systems)
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training Wear a respirator conforming to EN 140 with Type A filter or better Wear suitable coveralls to prevent exposure to the skin Use suitable eye protection
Remarks	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
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	Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN 374) in combination with 'basic' employee training
Remarks	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	Ad hoc manual application via trigger sprays, dipping, etc
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	25%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Disposal of wastes
Covers concentrations up to	25%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374

Remarks	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	Storage
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).
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00218 mg/l	0.002
Freshwater sediment	0.00976 mg/kg dw	0.002
Marine water	0.000217 mg/l	0.002
Marine sediment	0.000975 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	1.8 ppm	0.18
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	4.12 mg/kg bw/d	0.206
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	4.12 mg/kg bw/d	0.206
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	1.7 ppm	0.17
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.428 mg/kg bw/d	0.321
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	0.9 ppm	0.087
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	6.43 mg/kg bw/d	0.321
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	3.6 ppm	0.36
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	8.23 mg/kg bw/d	0.411
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5.4 ppm	0.54
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.65 mg/kg bw/d	0.082
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5.4 ppm	0.54
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.65 mg/kg bw/d	0.082
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.01 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.02 mg/kg bw/d	0.01
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	1.8 ppm	0.18
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	0.82 mg/kg bw/d	0.041

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in agrochemicals
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
Product category(ies)	PC12 - Fertilisers PC27 - Plant protection products
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

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 recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations

Control of consumer exposure	
Product categories [PC]	PC12 - Fertilisers
Covers concentrations up to	3%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 0.025 kg
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).

	Covers use up to 1 events per day
Use in room with a volume of minimum	20 m3
Operational conditions	Covers use under typical household ventilation.

Product categories [PC]	PC27 - Plant protection products
Covers concentrations up to	3%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 0.025 kg
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently). Covers use up to 1 events per day
Use in room with a volume of minimum	20 m3
Operational conditions	Covers use under typical household ventilation.

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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00217 mg/l	0.002
Freshwater sediment	0.00974 mg/kg dw	0.002
Marine water	0.000217 mg/l	0.002
Marine sediment	0.000973 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 mg/m³

Calculation method Risk management measures are based on qualitative risk characterization
Remarks Qualitative approach used to conclude safe use

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Functional fluids
Type	Worker
Main user group	Industrial uses: Uses of substances as such or in preparations at industrial sites
Environmental release category(ies)	ERC7 - Industrial use of substances in closed systems
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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) - ERC7 - Industrial use of substances in closed systems

Amounts used

Type	Daily amount per site
Value	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	26000
Units	kg/d

Other operational conditions of use affecting environmental exposure

Type	Continuous release
Emission days	20

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite;	87.4%

STP)	
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage 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 Retain drain downs in sealed storage pending disposal or for subsequent recycle

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Title	Bulk transfers (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).

Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
Title	Bulk transfers (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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	(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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Re-manufacture of reject articles
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection

Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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
Remarks	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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) Elevated temperature
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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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) - ERC7 - Industrial use of substances in closed systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00218 mg/l	0.002
Freshwater sediment	0.00978 mg/kg dw	0.002
Marine water	0.000218 mg/l	0.002
Marine sediment	0.000977 mg/kg dw	0.002
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC9 - Transfer of substance or	Worker - dermal, long-term -	6.86 mg/kg bw/d	0.343

preparation into small containers (dedicated filling line, including weighing)	systemic		
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.5
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 bw/d	0.137
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.5
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 bw/d	0.137
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	3 ppm	0.04
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	2 ppm	0.2
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Functional fluids
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC9a - Wide dispersive indoor use of substances in closed systems ERC9b - Wide dispersive outdoor use of substances in closed systems
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) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems
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) - ERC9a - Wide dispersive indoor use of substances in closed systems
- ERC9b - Wide dispersive outdoor use of substances in closed systems

Amounts used

Type	Daily amount per site
Value	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	4.8
Units	kg/d

Other operational conditions of use affecting environmental exposure

Type	Continuous release
Emission days	20

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP

Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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

Control measures to prevent releases

Water	>= Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Title	Drum/batch transfers
Covers concentrations up to	100%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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)
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).
Conditions and measures related to personal protection, hygiene and	Use suitable eye protection Wear suitable gloves tested to EN 374

health evaluation	
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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).
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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)	PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems
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).
Remarks	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)	PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed

	systems
Title	General exposures (closed systems) Elevated temperature
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	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings Efficiency of at least 90%
Remarks	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	Re-manufacture of reject articles
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 good standard of controlled ventilation (10 to 15 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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
Remarks	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	Store substance within a closed system

the worker	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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) - ERC9a - Wide dispersive indoor use of substances in closed systems - ERC9b - Wide dispersive outdoor use of substances in closed systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00218 mg/l	0.002
Freshwater sediment	0.00974 mg/kg dw	0.002
Marine water	0.000217 mg/l	< 0.001
Marine sediment	0.000973 mg/kg dw	0.002
Soil	0.000487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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)
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
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 bw/d	0.137
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including	Worker - inhalative, long-term - systemic	6 ppm	0.6

weighing)			
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	6 ppm	0.6
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	3.0 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems	Worker - dermal, long-term - systemic	1.71 mg/kg bw/d	0.086
PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC20 - Heat and pressure transfer fluids in dispersive, professional use but closed systems	Worker - dermal, long-term - systemic	1.71 mg/kg bw/d	0.086
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - inhalative, long-term - systemic	6 ppm	0.6
PROC9 - Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.69
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.5 ppm	0.45
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 bw/d	0.137
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	3.0 ppm	0.001
PROC1 - Use in closed process, no	Worker - dermal, long-term -	6.86 mg/kg bw/d	0.017

likelihood of exposure	systemic		
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Functional fluids
Type	Consumer
Main user group	Consumer uses: Private households (= general public = consumers)
Environmental release category(ies)	ERC9a - Wide dispersive indoor use of substances in closed systems ERC9b - Wide dispersive outdoor use of substances in closed systems
Product category(ies)	PC16 - Heat transfer fluids PC17 - Hydraulic fluids
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) - ERC9a - Wide dispersive indoor use of substances in closed systems
- ERC9b - Wide dispersive outdoor use of substances in closed systems

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 recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations

Control of consumer exposure	
Product categories [PC]	PC16 - Heat transfer fluids
Covers concentrations up to	50%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 2.2 kg
Exposure duration	Avoid carrying out operation for more than 12 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).

	Covers use up to 4 times per year
Use in room with a volume of minimum	34 m3
Operational conditions	Covers use under typical household ventilation.

Product categories [PC]	PC17 - Hydraulic fluids
Covers concentrations up to	50%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 2.2 kg
Exposure duration	Avoid carrying out operation for more than 12 minutes
Use frequency	Covers daily exposures up to 8 hours (unless stated differently). Covers use up to 4 times per year
Use in room with a volume of minimum	34 m3
Operational conditions	Covers use under typical household ventilation.

Section 3 - Exposure estimation

Environmental release category(ies) - ERC9a - Wide dispersive indoor use of substances in closed systems - ERC9b - Wide dispersive outdoor use of substances in closed systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00217 mg/l	0.002
Freshwater sediment	0.00974 mg/kg dw	0.002
Marine water	0.000217 mg/l	< 0.001
Marine sediment	0.000973 mg/kg dw	0.002
Soil	0.00491 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 mg/m³

Calculation method Risk management measures are based on qualitative risk characterization
Remarks Qualitative approach used to conclude safe use

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Water treatment chemicals
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 PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13 - Treatment of articles by dipping and pouring
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	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	146
Units	kg/d

Other operational conditions of use affecting environmental exposure

Type	Continuous release
Emission days	20

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment	2000 m3/d

plant flow	
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage 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 Retain drain downs in sealed storage pending disposal or for subsequent recycle

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC2 - Use in closed, continuous process with occasional controlled exposure
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	General exposures (closed systems) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Remarks	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	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.331 mg/l	0.403
Freshwater sediment	1.83 mg/kg dw	0.458
Marine water	0.0331 mg/l	0.403
Marine sediment	0.183 mg/kg dw	0.458
Soil	0.0844 mg/kg dw	0.102

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	0.29 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	0.107 mg/kg bw/d	0.343
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging)	Worker - inhalative, long-term - systemic	5 ppm	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	2.74 mg/kg bw/d	0.137
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.01 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Water treatment chemicals
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC8f - Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC13 - Treatment of articles by dipping and pouring
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) - ERC8f - Wide dispersive outdoor use resulting in inclusion into or onto a matrix

Amounts used

Type	Daily amount per site
Value	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	117
Units	kg/d

Other operational conditions of use affecting environmental exposure

Type	Continuous release
Emission days	20

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite;	87.4%

STP)	
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	General exposures (closed systems) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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 (closed systems) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Equipment cleaning and maintenance
Covers concentrations up to	100%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Remarks	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) - ERC8f - Wide dispersive outdoor use resulting in inclusion into or onto a matrix

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw

Impact on Sewage Treatment 200 mg/l
Food chain 56 mg/kg
Intermittent release 11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.0272 mg/l	0.027
Freshwater sediment	0.123 mg/kg dw	0.031
Marine water	0.00217 mg/l	0.027
Marine sediment	0.0123 mg/kg dw	0.031
Soil	0.00983 mg/kg dw	0.012

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic 83 mg/kg bw/d
Worker - inhalative, long-term - local 67.5 mg/m³
Worker - inhalative, short-term - local 101.2 mg/m³
Consumer - oral, long-term - systemic 6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic 40.5 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	3 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	5 ppm	0.5
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6 ppm	0.6
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 bw/d	0.137
PROC13 - Treatment of articles by dipping and pouring	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
PROC13 - Treatment of articles by dipping and pouring	Worker - dermal, long-term - systemic	2.74 mg/kg bw/d	0.137
PROC1 - Use in closed process, no likelihood of exposure	Worker - inhalative, long-term - systemic	0.01 ppm	0.001
PROC1 - Use in closed process, no	Worker - dermal, long-term -	0.34 mg/kg bw/d	0.017

likelihood of exposure	systemic		

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Water treatment chemicals
Type	Consumer
Main user group	Consumer uses: Private households (= general public = consumers)
Environmental release category(ies)	ERC8f - Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Product category(ies)	PC37 - Water treatment chemicals
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) - ERC8f - Wide dispersive outdoor use resulting in inclusion into or onto a matrix

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 recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations

Control of consumer exposure	
Product categories [PC]	PC37 - Water treatment chemicals
Covers concentrations up to	20%
Physical form of product	Liquid, vapour pressure < 10 Pa (STP)
Amounts used	Covers use up to 0.01 kg
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently). Covers use up to 1 events per day
Use in room with a volume of minimum	20 m3

Operational conditions	Covers use under typical household ventilation.

Section 3 - Exposure estimation

Environmental release category(ies) - ERC8f - Wide dispersive outdoor use resulting in inclusion into or onto a matrix

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.0272 mg/l	0.027
Freshwater sediment	0.123 mg/kg dw	0.031
Marine water	0.00271 mg/l	0.027
Marine sediment	0.0123 mg/kg dw	0.031
Soil	0.00983 mg/kg dw	0.012

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 mg/m³

Calculation method Risk management measures are based on qualitative risk characterization
Remarks Qualitative approach used to conclude safe use

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in laboratories
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)	PROC10 - Roller application or brushing PROC15 - Use as laboratory reagent
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	1000
Units	kg/d

Type	Maximum daily site tonnage
Value	5600
Units	kg/d

Other operational conditions of use affecting environmental exposure

Type	Continuous release
Emission days	20

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage 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 Retain drain downs in sealed storage pending disposal or for subsequent recycle

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC15 - Use as laboratory reagent
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) Avoid manual contact with wet work pieces
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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) Avoid manual contact with wet work pieces
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00359 mg/l	0.028
Freshwater sediment	0.126 mg/kg dw	0.032
Marine water	0.000373 mg/l	0.031
Marine sediment	0.0138 mg/kg dw	0.035
Soil	0.00823 mg/kg dw	0.010

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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)
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3 ppm	0.5
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.274

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in laboratories
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
Process category(ies)	PROC10 - Roller application or brushing PROC15 - Use as laboratory reagent
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

Amounts used

Type	Daily amount per site
Value	0.013
Units	kg/d

Type	Maximum daily site tonnage
Value	170
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

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
Removal efficiency fraction (offsite; STP)	87.4%
Remarks	All contaminated waste water must be processed in an industrial or municipal wastewatertreatment plant that incorporates both primary and secondary treatments.

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage 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 Retain drain downs in sealed storage pending disposal or for subsequent recycle

Control measures to prevent releases

Water	Provide onsite wastewater removal efficiency of >= 99.98% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC15 - Use as laboratory reagent
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) Avoid manual contact with wet work pieces
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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
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) Avoid manual contact with wet work pieces
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00222 mg/l	0.002
Freshwater sediment	0.00888 mg/kg dw	0.002
Marine water	0.00221 mg/l	0.002
Marine sediment	0.000865 mg/kg dw	0.002
Soil	0.00260 mg/kg dw	0.003

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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)
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC10 - Roller application or brushing	Worker - inhalative, long-term - systemic	3 ppm	0.5
PROC10 - Roller application or brushing	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.274

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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	Cosmetics, personal care products Perfumes, fragrances
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
Product category(ies)	PC28 - Perfumes, fragrances PC39 - Cosmetics, personal care products
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

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 recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations

Section 3 - Exposure estimation

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

Predicted No Effect Concentration (PNEC)

Freshwater 1.1 mg/l

Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00224 mg/l	0.002
Freshwater sediment	0.00898 mg/kg dw	0.002
Marine water	0.000223 mg/l	0.002
Marine sediment	0.000904 mg/kg dw	0.002
Soil	0.00493 mg/kg dw	0.003

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 mg/m³

Calculation method Risk management measures are based on qualitative risk characterization
Remarks Qualitative approach used to conclude safe use

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in Firefoams
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 PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC7 - Industrial spraying PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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	50
Units	kg/d

Type	Maximum daily site tonnage
Value	1440
Units	kg/d

Other operational conditions of use affecting environmental exposure

Type	Intermittent release
Emission days	20

Conditions and measures related to municipal sewage treatment plant

Type	Municipal STP
Assumed domestic sewage treatment plant flow	2000 m3/d
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

Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage

Control measures to prevent releases

Air	Not applicable Treat air emission to provide the required removal efficiency of 0%
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of Municipal STP Efficiency of at least 87%

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of 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).

Process category(ies)	PROC7 - Industrial spraying
Covers concentrations up to	1%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC7 - Industrial 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).
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented

Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Title	Mixing operations (open systems) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC7 - Industrial spraying
Covers concentrations up to	1%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw

Marine water 0.11 mg/l
Marine sediment 0.44 mg/kg dw
Soil 0.32 mg/kg dw
Impact on Sewage Treatment 200 mg/l
Food chain 56 mg/kg
Intermittent release 11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00359 mg/l	0.028
Freshwater sediment	0.126 mg/kg dw	0.032
Marine water	0.000373 mg/l	0.031
Marine sediment	0.0138 mg/kg dw	0.035
Soil	0.00823 mg/kg dw	0.010

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic 83 mg/kg bw/d
Worker - inhalative, long-term - local 67.5 mg/m³
Worker - inhalative, short-term - local 101.2 mg/m³
Consumer - oral, long-term - systemic 6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic 40.5 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	0.006 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.204 mg/kg bw/d	0.01
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	4.5 ppm	0.45
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	4.3 mg/kg bw/d	0.214
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	8.2 mg/kg bw/d	0.411
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	4.5 ppm	0.45
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	4.3 mg/kg bw/d	0.214
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	1.8 mg/l	0.18
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	4.1 mg/kg bw/d	0.206
PROC8a - Transfer of substance or	Worker - inhalative, long-term	3 ppm	0.3

preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	- systemic		
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	8.2 mg/kg bw/d	0.411
PROC7 - Industrial spraying	Worker - inhalative, long-term - systemic	4.5 ppm	0.45
PROC7 - Industrial spraying	Worker - dermal, long-term - systemic	4.3 mg/kg bw/d	0.214

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in Firefoams
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC8d - Wide dispersive outdoor use of processing aids in open systems
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC11 - Non industrial spraying
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) - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Amounts used

Type	Daily amount per site
Value	200
Units	kg/d

Other operational conditions of use affecting environmental exposure

Type	Intermittent release
Emission days	20

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	Prevent discharge of undissolved substance to or recover from onsite wastewater

Control measures to prevent releases

Air	Not applicable

	Treat air emission to provide the required removal efficiency of 0%
Soil	not applicable - no direct release to soil

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of 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).

Process category(ies)	PROC11 - Non industrial 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374
Remarks	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
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).
Remarks	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	Drum/batch transfers
Covers concentrations up to	100%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Mixing operations (open systems) 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374
Remarks	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) - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l

Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Marine water	0.000891 mg/l	0.001
Marine sediment	0.0011620 mg/kg dw	0.002

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	2.9 ppm	0.29
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	2.14 mg/kg bw/d	0.107
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	4.5 ppm	0.45
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	4.3 mg/kg bw/d	0.214
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	1.8 mg/l	0.5
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	4.1 mg/kg bw/d	0.069
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63

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 bw/d	0.137

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in Firefoams Aviation.
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC8d - Wide dispersive outdoor use of processing aids in open systems
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC11 - Non industrial spraying
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) - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Amounts used

Type	Daily amount per site
Value	1
Units	kg/d

Type	Maximum daily site tonnage
Value	175

Other operational conditions of use affecting environmental exposure

Type	Intermittent release
Emission days	20

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,	Prevent discharge of undissolved substance to or recover from onsite wastewater

air emissions	
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage

Control measures to prevent releases

Air	Not applicable Treat air emission to provide the required removal efficiency of 0%
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of Municipal STP Incinerate with adequate scrubbing and ash disposal. Efficiency of at least 87% Provide onsite wastewater removal efficiency of 99.98%

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Title	Storage
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).
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Indoor/Outdoor use	Outdoor use
Operational conditions	Assumes use at not more than 20°C above ambient temperature, unless stated differently

Process category(ies)	PROC11 - Non industrial 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).
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Indoor/Outdoor use	Outdoor use
Operational conditions	Assumes use at not more than 20°C above ambient temperature, unless stated differently

Process category(ies)	PROC11 - Non industrial 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).
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Indoor/Outdoor use	Outdoor use
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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374

Remarks	Assumes a good basic standard of occupational hygiene is implemented
Indoor/Outdoor use	Outdoor use
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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Indoor/Outdoor use	Outdoor use
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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Indoor/Outdoor use	Outdoor use
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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Indoor/Outdoor use	Outdoor use
Operational conditions	Assumes use at not more than 20°C above ambient temperature, unless stated differently

Section 3 - Exposure estimation

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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw

Impact on Sewage Treatment 200 mg/l
Food chain 56 mg/kg
Intermittent release 11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00252 mg/l	0.008
Freshwater sediment	0.037 mg/kg dw	0.009
Marine water	0.000251 mg/l	0.008
Marine sediment	0.00371 mg/kg dw	0.009
Soil	0.00259 mg/kg dw	0.003

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic 83 mg/kg bw/d
Worker - inhalative, long-term - local 67.5 mg/m³
Worker - inhalative, short-term - local 101.2 mg/m³
Consumer - oral, long-term - systemic 6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic 40.5 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	0.004 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.02 mg/kg bw/d	0.01
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	2.03 ppm	0.203
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	11 mg/kg bw/d	0.54
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	0.8 mg/l	0.8
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.02 mg/kg bw/d	0.01
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.6 mg/kg bw/d	0.08

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in Firefoams
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC8d - Wide dispersive outdoor use of processing aids in open systems
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC11 - Non industrial spraying
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) - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Amounts used

Type	Daily amount per site
Value	0.082
Units	kg/d

Type	Maximum daily site tonnage
Value	21

Other operational conditions of use affecting environmental exposure

Type	Intermittent release
Emission days	20

Control measures to prevent releases

Air	Not applicable Treat air emission to provide the required removal efficiency of 0%
Water	Not applicable as there is no release to wastewater

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of 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).

Process category(ies)	PROC11 - Non industrial spraying
Covers concentrations up to	1%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Remarks	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
Covers concentrations up to	1%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and	Use suitable eye protection Wear suitable gloves tested to EN 374

health evaluation	
Remarks	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) - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00546 mg/l	0.005
Freshwater sediment	0.0236 mg/kg dw	0.006
Marine water	0.000546 mg/l	0.005
Marine sediment	0.00237 mg/kg dw	0.006
Soil	0.00259 mg/kg dw	0.003

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	0.004 ppm	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.02 mg/kg bw/d	0.01
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	2.03 ppm	0.203
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	11 mg/kg bw/d	0.536
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
PROC8a - Transfer of substance or preparation (charging/discharging)	Worker - dermal, long-term - systemic	1.6 mg/kg bw/d	0.082

from/to vessels/large containers at non dedicated facilities			
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	2.1 mg/l	0.21
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	4.1 mg/kg bw/d	0.206
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	6.3 ppm	0.63
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.6 mg/kg bw/d	0.082

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in Firefoams Indoor
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
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities PROC11 - Non industrial spraying
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

Amounts used

Type	Daily amount per site
Value	0.054
Units	kg/d

Type	Maximum daily site tonnage
Value	80

Other operational conditions of use affecting environmental exposure

Type	Intermittent release
Emission days	365

Risk management measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions	Prevent environmental discharge consistent with regulatory requirements

Control measures to prevent releases

Air	Not applicable Treat air emission to provide the required removal efficiency of 0%
Water	Not applicable as there is no release to wastewater

	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 99.98%
Soil	not applicable - no direct release to soil

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
Process category(ies)	PROC1 - Use in closed process, no likelihood of exposure
Title	Storage
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).

Process category(ies)	PROC11 - Non industrial spraying
Title	Manual
Covers concentrations up to	1%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374
Remarks	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
Covers concentrations up to	1%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Remarks	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	Drum/batch transfers
Covers concentrations up to	25%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection

Remarks	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	25%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
Use frequency	Covers daily exposures up to 8 hours (unless stated differently).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00272 mg/l	0.003
Freshwater sediment	0.0112 mg/kg dw	0.003
Marine water	0.000272 mg/l	0.003
Marine sediment	0.00112 mg/kg dw	0.003
Soil	0.00259 mg/kg dw	0.003

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	0.006 ppm	0.001

PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.02 mg/kg bw/d	0.01
PROC11 - Non industrial spraying	Worker - inhalative, long-term - systemic	4.2 ppm	0.42
PROC11 - Non industrial spraying	Worker - dermal, long-term - systemic	2.13 mg/kg bw/d	0.107
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5.4 ppm	0.54
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.65 mg/kg bw/d	0.08
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	1.2 mg/l	0.012
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.2 mg/kg bw/d	0.01
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	5.4 ppm	0.54
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	1.65 mg/kg bw/d	0.08

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in oil and gas field drilling and production operations
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Environmental release category(ies)	ERC8d - Wide dispersive outdoor use of processing aids in open systems
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
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) - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Amounts used

Type	Daily amount per site
Value	660
Units	kg/d

Type	Maximum daily site tonnage
Value	32

Other operational conditions of use affecting environmental exposure

Type	Continuous release
Emission days	30

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	Prevent discharge of undissolved substance to or recover from onsite wastewater

measures to reduce or limit discharges, air emissions	
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage

Control measures to prevent releases

Air	Not applicable Treat air emission to provide the required removal efficiency of 0%
Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of Municipal STP Efficiency of at least 87% Incinerate with adequate scrubbing and ash disposal. Provide onsite wastewater removal efficiency of >= 99.98%

Conditions and measures related to external recovery of waste

Method	External recovery and recycling of waste should comply with applicable local and/or national regulations

Conditions and measures related to external treatment of waste for disposal

Disposal	Dispose of waste or used sacks/containers according to local regulations

Control of worker exposure	
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	Transfer via enclosed lines Clear transfer lines prior to de-coupling
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Avoid spillage when withdrawing pump Use drum pumps or carefully pour from container
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 extract ventilation to points where emissions occur Efficiency of at least 90%
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	Material transfers (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).

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	100%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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 Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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 Drain or remove substance from equipment prior to break-in or maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection

Remarks	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	General exposures (closed systems) 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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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) - ERC8d - Wide dispersive outdoor use of processing aids in open systems

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.0264 mg/l	0.297
Freshwater sediment	1.35 mg/kg dw	0.338
Marine water	0.00264 mg/l	0.297
Marine sediment	0.135 mg/kg dw	0.338
Soil	0.0611 mg/kg dw	0.074

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	Worker - inhalative, long-term	3.9 ppm	0.39

preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	- systemic		
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3.9 mg/l	0.39
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2.6 mg/l	0.26
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.442 mg/kg bw/d	0.022
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	2.6 mg/l	0.65
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.442 mg/kg bw/d	0.09
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	6.5 mg/l	0.65
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.8 ppm	0.48
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	2.73 mg/kg bw/d	0.138
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2.6 mg/l	0.26
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.042 mg/kg bw/d	0.022
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2.6 mg/l	0.26
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.042 mg/kg bw/d	0.022
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.8 ppm	0.48
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	2.73 mg/kg bw/d	0.138
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	6.5 mg/l	0.65

PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.8 ppm	0.48
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	2.73 mg/kg bw/d	0.136
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.36 mg/kg bw/d	0.068

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

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

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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 in oil and gas field drilling and production operations
Type	Worker
Main user group	Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
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 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
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) - ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles

Amounts used

Type	Daily amount per site
Value	3100
Units	kg/d

Type	Maximum daily site tonnage
Value	575000

Other operational conditions of use affecting environmental exposure

Type	Intermittent release
Emission days	16

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	Prevent discharge of undissolved substance to or recover from onsite wastewater

Control measures to prevent releases

Water	Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 99.98%

Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations

Control of worker exposure	
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	Transfer via enclosed lines Clear transfer lines prior to de-coupling
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Avoid spillage when withdrawing pump Use drum pumps or carefully pour from container
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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 extract ventilation to points where emissions occur Efficiency of at least 90%
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection Wear suitable gloves tested to EN 374
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	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).
Conditions and measures related to personal protection, hygiene and	Use suitable eye protection

health evaluation	
Remarks	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	Material transfers (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).

Process category(ies)	PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
Covers concentrations up to	100%
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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 Use suitable eye protection
Remarks	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
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).
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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
Exposure duration	Avoid carrying out activities involving exposure for more than 4 hours
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 Drain or remove substance from equipment prior to break-in or maintenance
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374 Use suitable eye protection
Remarks	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	General exposures (closed systems) 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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	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	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Marine water	0.000373 mg/l	0.031
Marine sediment	0.0138 mg/kg dw	0.035

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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	3.9 ppm	0.39
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	3.9 mg/l	0.39

PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2.6 mg/l	0.26
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.442 mg/kg bw/d	0.022
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	2.6 mg/l	0.65
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	0.442 mg/kg bw/d	0.09
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	6.5 mg/l	0.65
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.8 ppm	0.48
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	2.73 mg/kg bw/d	0.138
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2.6 mg/l	0.26
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.042 mg/kg bw/d	0.022
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2.6 mg/l	0.26
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	0.042 mg/kg bw/d	0.022
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.8 ppm	0.48
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	2.73 mg/kg bw/d	0.138
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - inhalative, long-term - systemic	6.5 mg/l	0.65
PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Worker - dermal, long-term - systemic	1.78 mg/kg bw/d	0.09
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	4.8 ppm	0.48
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - dermal, long-term - systemic	2.73 mg/kg bw/d	0.136

PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	3 ppm	0.3
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.36 mg/kg bw/d	0.068

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination. 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]

Chemical name	2-(2-butoxyethoxy)ethanol
Pure substance/mixture	Substance
REACH registration number	01-2119475104-44-XXXX
CAS No	112-34-5
EC No (EU Index No)	203-961-6
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)	ERC1 - Manufacture of substances ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
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) 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
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
- ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

Amounts used

Type	Daily amount per site
Value	10000
Units	kg/d

Type	Maximum daily site tonnage
Value	290000

Other operational conditions of use affecting environmental exposure

Type	Continuous release
Emission days	300

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	Prevent discharge of undissolved substance to or recover from onsite wastewater
Additional good practice advice beyond the REACH Chemical Safety Report	Bund storage facilities to prevent soil and water pollution in the event of spillage 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

Control measures to prevent releases

Air	Not applicable Treat air emission to provide the required removal efficiency of 0%
Water	Provide onsite wastewater removal efficiency of >= 99.98% Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= 87% Incinerate with adequate scrubbing and ash disposal.

Conditions and measures related to external treatment of waste for disposal

Disposal	External treatment and disposal of waste should comply with applicable local and/or national regulations

Control of worker exposure	
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
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	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
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	PROC3 - Use in closed batch process (synthesis or formulation)
Title	General exposures (closed systems) 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection

Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Process category(ies)	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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Handle substance within a closed system
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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 transport
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)
Conditions and measures related to	Use suitable eye protection

personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN 374
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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	Transfer via enclosed lines
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at 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).
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection
Remarks	Assumes a good basic standard of occupational hygiene is implemented
Operational conditions	Assumes activities are at ambient temperature (unless stated differently)

Section 3 - Exposure estimation

Environmental release category(ies) - ERC1 - Manufacture of substances
- ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)

Predicted No Effect Concentration (PNEC)

Freshwater	1.1 mg/l
Freshwater sediment	4.4 mg/kg dw
Marine water	0.11 mg/l
Marine sediment	0.44 mg/kg dw
Soil	0.32 mg/kg dw
Impact on Sewage Treatment	200 mg/l
Food chain	56 mg/kg
Intermittent release	11 mg/l

Calculation method Used ECETOC TRA model

Environment	predicted exposure level	Risk characterisation ratio (RCR)
Freshwater	0.00311 mg/l	0.003
Freshwater sediment	0.0149 mg/kg dw	0.004
Marine water	0.000310 mg/l	0.003
Marine sediment	0.00149 mg/kg dw	0.004
Soil	0.00487 mg/kg dw	0.006

Derived No Effect Level (DNEL):

Worker - dermal, long-term - systemic	83 mg/kg bw/d
Worker - inhalative, long-term - local	67.5 mg/m³
Worker - inhalative, short-term - local	101.2 mg/m³
Consumer - oral, long-term - systemic	6.25 mg/kg bw/d
Consumer - inhalative, long-term - systemic	40.5 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/l	0.001
PROC1 - Use in closed process, no likelihood of exposure	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.017
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - inhalative, long-term - systemic	2 mg/l	0.2
PROC3 - Use in closed batch process (synthesis or formulation)	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.017
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC8a - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Worker - inhalative, long-term - systemic	3.5 ppm	0.35
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 bw/d	0.137
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - inhalative, long-term - systemic	5 ppm	0.3
PROC8b - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	Worker - dermal, long-term - systemic	6.86 mg/kg bw/d	0.343
PROC2 - Use in closed, continuous process with occasional controlled exposure	Worker - inhalative, long-term - systemic	0.4 ppm	0.04
PROC2 - Use in closed, continuous process with occasional controlled	Worker - dermal, long-term - systemic	1.37 mg/kg bw/d	0.069

exposure			
PROC15 - Use as laboratory reagent	Worker - inhalative, long-term - systemic	3 mg/l	0.3
PROC15 - Use as laboratory reagent	Worker - dermal, long-term - systemic	0.34 mg/kg bw/d	0.017

Section 4 - Guidance to check compliance with the exposure scenario

Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. 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).