Manufacturer:
ÅngströmBond®

Product Name:
Desolite® 3471-3-14 Single Coat Primary Optical Fiber Coating, UV Cure (1 kg)

Manufacturer Part Number:
COV-3471-3-14-1KG

Click here for more details on the Desolite® 3471-3-14 Single Coat Primary Optical Fiber Coating, UV Cure (1 kg)

Safety Data Sheet according to Regulation (EU) No. 1907/2006 as amended

ÅNGSTRÖMBOND®

DeSolite 3471-3-14

Version 3.0 Revision Date 04.08.2025 Print Date 05.08.2025

This document is formatted for A4 paper size

DeSolite 3471-3-14

Version 3.0 Revision Date 04.08.2025 Print Date 05.08.2025

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

1.1 Product identifier

DESOLITE 3471-3-14

Material number: 50025036

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

Use:
UV-curable coatings, inks and matrix materials.
For details of the identified uses according to REACH-Regulation (EU) No. 1907/2006 refer to the annex of this safety data sheet.

Uses advised against:
Consumer use

1.3 Details of the supplier of the safety data sheet

Covestro Deutschland AG
COV Global Product Safety
51365 Leverkusen

Tel.: +49 214 6009 8134
Email: ProductSafetyEMLA@covestro.com

1.4 Emergency telephone number

+1-703-527-3887 (Chemtrec)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Skin irritation, Category 2 (H315)
Eye irritation, Category 2 (H319)
Sensitization of the skin, Category 1 (H317)
Carcinogenicity, Category 2 (H351)
Reproductive toxicity, Category 1B (H360F)
Chronically hazardous to the aquatic environment, Category 2 (H411)

2.2 Label elements

Danger

Hazardous components which must be listed on the label
2-(2-Ethoxyethoxy)ethyl acrylate
2,2-bis(acryloyloxymethyl)butyl acrylate
diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
2-hydroxyethyl acrylate

Hazard statements:

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H360F May damage fertility.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements:
P201 Obtain special instructions before use.
P261 Avoid breathing mist or vapours.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.

2.3 Other hazards

The following percentage of the mixture consists of ingredient(s) with unknown acute inhalation toxicity: 75 %

The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 75 %

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

Type of product: Mixture

3.2 Mixtures

optical fiber coatings

Hazardous components

2-(2-Ethoxyethoxy)ethyl acrylate
Concentration [wt.-%]: >= 10 - < 20
REACH Registration Number: 01-2120752384-53
CAS-No.: 7328-17-8
Classification (1272/2008/CE): Acute Tox. 4 Oral H302 Acute Tox. 3 Dermal H311 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Skin Sens. 1A H317 Aquatic Chronic 2 H411
ATE (oral): 1.106 mg/kg
ATE (dermal): 300 mg/kg

2,2-bis(acryloyloxymethyl)butyl acrylate
Concentration [wt.-%]: >= 5 - < 10
Index-No.: 607-111-00-9
EC-No.: 239-701-3
REACH Registration Number: 01-2119489896-11-0025, 01-2119489896-11-0010
CAS-No.: 15625-89-5
Classification (1272/2008/CE): Skin Irrit. 2 H315 Eye Irrit. 2 H319 Skin Sens. 1 H317 Carc. 2 H351 Aquatic Acute 1 H400 Aquatic Chronic 1 H410
M-factor (acute aquat. tox.): 1
M-factor (chron. aquat. tox.): 1

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Concentration [wt.-%]: >= 1 - < 2,5
EC-No.: 278-355-8
CAS-No.: 75980-60-8
Classification (1272/2008/CE): Skin Sens. 1B H317 Repr. 1B H360Fd Aquatic Chronic 2 H411

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Concentration [wt.-%]: >= 0,3 - < 1
EC-No.: 270-854-9
Classification (1272/2008/CE): Skin Irrit. 2 H315 Skin Sens. 1 H317 Aquatic Chronic 3 H412

2-hydroxyethyl acrylate
Concentration [wt.-%]: >= 0,2 - < 0,25
Index-No.: 607-072-00-8
EC-No.: 212-454-9
REACH Registration Number: 01-2119459345-34
CAS-No.: 818-61-1
Classification (1272/2008/CE): Acute Tox. 4 Oral H302 Acute Tox. 3 Dermal H311 Skin Corr. 1B H314 Eye Dam. 1 H318 Skin Sens. 1 H317 Aquatic Acute 1 H400 Aquatic Chronic 3 H412
Specific threshold concentration (GHS):
Skin Sens. 1 H317 >= 0,2 %
M-factor (acute aquat. tox.): 1
ATE (oral): 540 mg/kg
ATE (dermal): 300 mg/kg

Candidate List of Substances of Very High Concern for Authorisation
This product contains substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 59).

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
CAS-No.: 75980-60-8

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Take off all contaminated clothing immediately.

For effective first-aid, special training / education is needed.

If inhaled: Take the person into the fresh air and keep him warm, let him rest; if there is difficulty in breathing, medical advice is required. If unconscious, place in recovery position and seek medical advice. Oxygen or artificial respiration if needed. If breathing is irregular or stopped, administer artificial respiration. Keep respiratory tract clear. Consult a physician if necessary.

Inhalation may provoke the following symptoms: respiratory tract irritation coughing

In the case of hazardous fumes, wear self contained breathing apparatus.

In case of skin contact: In case of skin contact wash affected areas thoroughly with soap and plenty of water. Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Thoroughly clean shoes before reuse. Consult a doctor in the event of a skin reaction.

Most important symptoms Skin irritation Redness

In case of eye contact: Hold the eyes open and rinse with preferably lukewarm water for a sufficiently long period of time (at least 10 minutes). Contact an ophthalmologist. Remove contact lenses.

Eye contact may provoke the following symptoms irritant effects eye redness

If swallowed: Do not induce vomiting without medical advice. Rinse mouth. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If a person vomits when lying on his back, place him in the recovery position. Never give anything by mouth to an unconscious person.

If victim is conscious: Give small amounts of water to drink.

If symptoms persist, call a physician or Poison Control Centre immediately.

4.2 Most important symptoms and effects, both acute and delayed

Notes to physician: Treat symptomatically.

4.3 Indication of any immediate medical attention and special treatment needed

Therapeutic measures: No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

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

5.2 Special hazards arising from the substance or mixture

Formation of carbon monoxide, carbon dioxide and other toxic gases in the event of fire or during thermal decomposition. Fire will produce dense black smoke containing hazardous combustion products (see section 10). In case of fire, may produce hazardous decomposition products such as: Acrylate monomers Aldehydes Organic acids

In the event of fire and/or explosion do not breathe fumes. Cool endangered vessels and containers with sprayed water. Heating raises pressure with consequent risk of bursting and explosion.

5.3 Advice for fire-fighters

Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.

Do not allow contaminated extinguishing water to enter the soil, ground-water or surface waters. Immediately evacuate personnel to safe areas.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Immediately evacuate personnel to safe areas. Avoid breathing mist or vapours. Put on protective equipment (see section 8). Ensure adequate ventilation/exhaust extraction. Keep unauthorized persons away. In case of insufficient ventilation, wear suitable respiratory equipment.

6.2 Environment related measures

Do not allow to escape into waterways, wastewater or soil. If the product contaminates rivers and lakes or drains inform respective authorities. Inform the responsible authorities in case of gas leakage, or of entry into waterways, soil or drains. Collect spillage. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

6.3 Methods and material for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13). Dispose of wastes in an approved waste disposal facility. Do not discharge large quantities of concentrated spills or residues into surface water or sanitary sewer system.

6.4 Reference to other sections

For personal protection see section 8. For further disposal measures see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

General conditions of use are further specified in the annex according to REACH-Regulation (EU) No. 1907/2006.

For personal protection see section 8. Avoid contact with skin, eyes and clothing. Do not breathe mist or vapours. Do not ingest. Ensure adequate ventilation and, if necessary, exhaust ventilation when handling or transferring the product. In case of insufficient ventilation, wear suitable respiratory equipment. The precautions required in the handling of acrylic acid esters must be taken. Do not re-use empty containers.

Smoking, eating and drinking should be prohibited in the application area. Wash skin thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas.

Persons who suffer from skin complaints or other hypersensitivity reactions of skin should not work with the product.

The personal protective measures described in section 8 must be observed. Avoid contact with skin and eyes absolutely.

Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work and use skin-protecting ointment. Keep working clothes separately. Change contaminated or soaked clothing immediately.

7.2 Conditions for safe storage, including any incompatibilities

Keep container dry and tightly closed in a cool and well ventilated place. Store in original container. Protect against heat and direct sunlight. Store locked up. When not in use, keep containers tightly closed. Keep in properly labelled containers. Use appropriate container to avoid environmental contamination. Polymerisation is a highly exothermic reaction and may generate sufficient heat to cause thermal decomposition and/or rupture containers. Inhibitor only effective in the presence of oxygen.

Storage class (TRGS 510) : 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

Recommended storage temperature: 15 - 30 °C

7.3 Specific end use(s)

UV-curable coatings, inks and matrix materials.

SECTION 8: Exposure controls/personal protection

Risk management measures are further specified in the annex according to REACH-Regulation (EU) No. 1907/2006.

8.1 Control parameters

Contains no substances with occupational exposure limit values.

Derived No Effect Level (DNEL)

2-(2-Ethoxyethoxy)ethyl acrylate

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects	2,6 mg/m3	
Workers	Dermal	Long-term systemic effects	0,083 mg/kg	

2,2-bis(acryloyloxymethyl)butyl acrylate

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects	17,1 mg/m3	Most sensitive endpoint: Repeated dose toxicity oral
Workers	Inhalation	Acute systemic effects		No hazard identified

Workers	Inhalation	Long-term local effects		Hazard unknown (no further information necessary)
Workers	Inhalation	Acute local effects		No hazard identified
Workers	Dermal	Long-term systemic effects	404 mg/kg bw/day	Most sensitive endpoint: Repeated dose toxicity oral
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local effects		Medium hazard (no threshold derived) Most sensitive endpoint: Sensitization/irritation (skin)
Workers	Dermal	Acute local effects		Medium hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin)
Workers	Eye contact	Local effects		Low hazard (no threshold derived) Most sensitive endpoint: Irritation (eye)

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects	0,822 mg/m3	Most sensitive endpoint: Repeated dose toxicity oral
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects		No hazard identified
Workers	Inhalation	Acute local effects		No hazard identified
Workers	Dermal	Long-term systemic effects	0,233 mg/kg bw/day	Most sensitive endpoint: Repeated dose toxicity oral
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local effects		Medium hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin)
Workers	Dermal	Acute local effects		Medium hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin)
Workers	Eye contact	Local effects		No hazard identified
Consumers	Inhalation	Long-term systemic effects	0,145 mg/m3	Most sensitive endpoint: Repeated dose toxicity oral
Consumers	Inhalation	Acute systemic effects		No hazard identified
Consumers	Inhalation	Long-term local effects		No hazard identified
Consumers	Inhalation	Acute local effects		No hazard identified
Consumers	Dermal	Long-term systemic effects	0,0833 mg/kg bw/day	Most sensitive endpoint: Repeated dose toxicity oral
Consumers	Dermal	Acute systemic effects		No hazard identified
Consumers	Dermal	Long-term local effects		Medium hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin)
Consumers	Dermal	Acute local effects		Medium hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin)

Consumers	Oral	Long-term systemic effects	0,0833 mg/kg bw/day	Most sensitive endpoint: Repeated dose toxicity oral
Consumers	Oral	Acute systemic effects		No hazard identified
Consumers	Eye contact	Local effects		No hazard identified

2-hydroxyethyl acrylate

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects		No hazard identified
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects	2,4 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute local effects		Hazard unknown (no further information necessary)
Workers	Dermal	Long-term systemic effects		No hazard identified
Workers	Dermal	Acute systemic effects		Medium hazard (no threshold derived)
Workers	Dermal	Long-term local effects		Medium hazard (no threshold derived)
Workers	Dermal	Acute local effects		Medium hazard (no threshold derived)
Workers	Eye contact	Local effects		Medium hazard (no threshold derived)
Consumers	Inhalation	Long-term systemic effects		No hazard identified
Consumers	Inhalation	Acute systemic effects		No hazard identified
Consumers	Inhalation	Long-term local effects		No hazard identified
Consumers	Inhalation	Acute local effects		No hazard identified
Consumers	Dermal	Long-term systemic effects		No hazard identified
Consumers	Dermal	Acute systemic effects		No hazard identified
Consumers	Dermal	Long-term local effects		No hazard identified
Consumers	Dermal	Acute local effects		No hazard identified
Consumers	Oral	Long-term systemic effects		No hazard identified
Consumers	Oral	Acute systemic effects		No hazard identified
Consumers	Eye contact	Local effects		Medium hazard (no threshold derived)

Predicted No Effect Concentration (PNEC)

2-(2-Ethoxyethoxy)ethyl acrylate

Compartment	Value	Remarks
Fresh water	0,0032 mg/l	
Fresh water sediment	0,004 mg/kg dry weight	

Marine water	0,00032 mg/l	
Marine sediment	0,0004 mg/kg dry weight	
Sewage treatment plant	7,7 mg/l	
Intermittent use/release	0,032 mg/l	

2,2-bis(acryloyloxymethyl)butyl acrylate

Compartment	Value	Remarks
Fresh water	0,00087 mg/l	
Fresh water sediment	0,017 mg/kg dry weight	
Marine water	0,000087 mg/l	
Marine sediment	0,002 mg/kg dry weight	
Sewage treatment plant	6,25 mg/l	
Air		No hazard identified
Soil	0,003 mg/kg dry weight	
Oral	10 mg/kg	
Intermittent use/release	0,0087 mg/l	Fresh water

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide

Compartment	Value	Remarks
Fresh water	1,4 µg/l	
Fresh water sediment	0,115 mg/kg dry weight	
Marine water	0,14 µg/l	
Marine sediment	0,0115 mg/kg dry weight	
Sewage treatment plant		No hazard identified
Air		No hazard identified
Soil	0,0222 mg/kg dry weight	
Oral		Does not bioaccumulate.
Intermittent use/release	14 µg/l	Fresh water

2-hydroxyethyl acrylate

Compartment	Value	Remarks
Fresh water	0,017 mg/l	
Fresh water sediment	0,064 mg/kg dry weight	
Marine water	0,002 mg/l	
Marine sediment	0,006 mg/kg dry weight	
Sewage treatment plant	10 mg/l	
Air		No hazard identified
Soil	0,003 mg/kg dry weight	
Oral		Does not bioaccumulate.
Intermittent use/release	0,036 mg/l	

8.2 Exposure controls

Appropriate engineering controls
If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Respiratory protection

Respiratory protection required in insufficiently ventilated working areas and during spraying. Respirator with a gas filter

If applicable, further recommendations regarding respiratory protection can be found in the annex.

Hand protection
Protective gloves complying with EN 374.
Nitrile rubber: thickness >=0,12mm; Break through time: < 60 min
Contaminated and/or damaged gloves must be changed. Avoid natural rubber gloves. Do not wear PVC gloves, as PVC absorbs acrylates.

Eye protection
Safety glasses with side-shields
Equipment should conform to EN 166

Skin and body protection
Use protective clothing (chemically resistant). Protective suit
Equipment should conform to EN 1149

Further protective measures
Wash face, hands and any exposed skin thoroughly after handling. Use appropriate degowning techniques to remove potentially contaminated clothing. Take off contaminated clothing and wash it before reuse. Ensure that eyewash stations and safety showers are close to the workstation location.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state:	liquid at 20 °C at 1.013 hPa
Appearance:	liquid
Colour:	colourless to yellowish
Odour:	characteristic
Odour Threshold:	not established
pH:	not applicable
Melting point/freezing point:	not established
Boiling point/boiling range:	not established
Flash point:	> 100 °C, closed cup
Evaporation rate:	not established
Flammability (solid, gas):	not applicable
Burning number:	not applicable
Upper/lower flammability or explosive limits:	not established
Vapour pressure:	not established
Relative vapour density:	not established
Density:	1,12 g/cm³ at 20 °C
Miscibility with water:	not established
Water solubility:	not established
Surface tension:	not established
Partition coefficient (n−octanol/water):	not established
Auto-ignition temperature:	not applicable
Ignition temperature:	not established
Decomposition temperature:	not established
Heat of combustion:	not established
Viscosity, dynamic:	8.140 - 13.140 mPa.s at 20 °C
Viscosity, kinematic:	> 7267 mm²/s at 20 °C

9.2 Other information

The indicated values do not necessarily correspond to the product specification. Please refer to the technical information sheet for specification data.

Explosive properties:	not established
Dust explosion class:	not applicable
Oxidising properties:	not established

SECTION 10: Stability and reactivity

10.1 Reactivity

None known.

10.2 Chemical stability

Stable under recommended storage conditions. The product is chemically stable.

10.3 Possibility of hazardous reactions

In case of heating risk of exothermic polymerisation. Strong exothermic reactions with peroxides may occur in presence of heavy metal ions.

10.4 Conditions to avoid

Keep away from heat and sources of ignition.
Exposure to sunlight.

10.5 Incompatible materials

Exothermic reaction with: Strong acids and strong bases polymerisation initiators Avoid radical-forming starting agents, peroxides and reactive metals.

10.6 Hazardous decomposition products

No hazardous decomposition products when stored and handled correctly.

SECTION 11: Toxicological information

Toxicological studies on the product are not yet available.

Please find below the toxicological data available to us for the components (hazardous components).

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity, oral
ATEmix (oral): > 2.000 mg/kg
Method: Calculation method

2-(2-Ethoxyethoxy)ethyl acrylate
LD50 rat, male/female: 1.106 mg/kg

LD50 rat: >= 500 mg/kg

2,2-bis(acryloyloxymethyl)butyl acrylate
LD50 rat, male/female: 3.680 mg/kg

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
LD50 rat, male/female: > 5.000 mg/kg
Method: OECD Test Guideline 401

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
LD50 rat, female: > 2.000 mg/kg
Assessment: The substance or mixture has no acute oral toxicity
Method: OECD Test Guideline 423

2-hydroxyethyl acrylate
LD50 rat, male/female: 540 mg/kg

Acute toxicity, dermal
ATEmix (dermal):> 2.000 mg/kg
Method: Calculation method

2-(2-Ethoxyethoxy)ethyl acrylate
LD50 rabbit, male: 1.000 - 2.000 mg/kg
Assessment: Harmful in contact with skin.
Method: OECD Test Guideline 402

LD50 rat, male/female: 400 - 2.000 mg/kg
Assessment: Toxic in contact with skin.
Method: OECD Test Guideline 402

2,2-bis(acryloyloxymethyl)butyl acrylate
LD50 rabbit: 5.170 mg/kg

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
LD50 rat, male/female: > 2.000 mg/kg
Method: OECD Test Guideline 402

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
LD50 rat: > 2.000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

2-hydroxyethyl acrylate
LD50 rat, male/female: > 1.000 mg/kg
Method: OECD Test Guideline 402

Assessment: Toxic in contact with skin.
Classification (1272/2008/CE)

Acute toxicity, inhalation
2-(2-Ethoxyethoxy)ethyl acrylate
Study not required according to Regulation (EC) No. 1907/2006 (REACH).

2,2-bis(acryloyloxymethyl)butyl acrylate
LC50 rat, male/female: 0,55 mg/l, 6 h
Test atmosphere: vapour
Assessment: The substance or mixture has no acute inhalation toxicity

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Assessment: no data available

2-hydroxyethyl acrylate
LC50 rat, female: > 1,45 mg/l, 7 h
Test atmosphere: vapour
Assessment: The substance or mixture has no acute inhalation toxicity

Primary skin irritation
2-(2-Ethoxyethoxy)ethyl acrylate
Irritating to skin.

Species: rabbit
Result: irritating
Classification: Causes skin irritation.
Method: OECD Test Guideline 404

2,2-bis(acryloyloxymethyl)butyl acrylate
Species: rabbit
Result: irritating
Classification: Causes skin irritation.
Method: OECD Test Guideline 404

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Species: rabbit
Result: slight irritant
Classification: No skin irritation

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Classification: Causes skin irritation.

Species: In vitro test system
Result: positive
Method: OECD Test Guideline 439

2-hydroxyethyl acrylate
Species: rabbit
Result: Corrosive
Classification: Causes severe skin burns and eye damage (Skin Corr. 1B).

Primary mucosae irritation
2-(2-Ethoxyethoxy)ethyl acrylate
Species: rabbit
Result: irritating
Classification: Causes serious eye irritation.
Method: OECD Test Guideline 405

2,2-bis(acryloyloxymethyl)butyl acrylate
Species: rabbit
Result: irritating
Classification: Causes serious eye irritation.
Method: Draize Test

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Species: rabbit
Result: slight irritant
Classification: No eye irritation

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Species: rabbit
Result: slight irritant
Classification: No eye irritation
Method: OECD Test Guideline 405

2-hydroxyethyl acrylate
Species: rabbit
Result: Corrosive
Classification: Causes serious eye damage.

Sensitisation
2-(2-Ethoxyethoxy)ethyl acrylate
Skin sensitisation according to Magnusson/Kligmann (maximizing test):
Species: Guinea pig
Result: positive
Classification: May cause sensitization by skin contact (Sub cat. 1A)
Method: OECD Test Guideline 406

Respiratory sensitization
No data available.

2,2-bis(acryloyloxymethyl)butyl acrylate
Skin sensitisation:
Species: Guinea pig
Result: positive
Classification: May cause sensitization by skin contact.

Respiratory sensitization
No data available.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Skin sensitization (local lymph node assay (LLNA)):
Species: Mouse
Result: positive
Classification: May cause sensitization by skin contact (Sub cat. 1B)
Method: OECD Test Guideline 429

Respiratory sensitization
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Skin sensitization (local lymph node assay (LLNA)):
Species: Mouse
Result: positive
Classification: May cause sensitization by skin contact.
Method: OECD Test Guideline 429

Respiratory sensitization
No data available.

2-hydroxyethyl acrylate
Skin sensitization (local lymph node assay (LLNA)):
Species: Mouse
Result: positive
Classification: May cause sensitization by skin contact.

Respiratory sensitization
No data available.

Subacute, subchronic and prolonged toxicity
2-(2-Ethoxyethoxy)ethyl acrylate
NOAEL: 25 mg/kg
Application Route: Oral
Species: rat, male/female
Frequency of treatment: daily
Method: OECD Test Guideline 422

2,2-bis(acryloyloxymethyl)butyl acrylate
NOAEL: 300 mg/kg
Application Route: Oral
Species: rat, male/female
Frequency of treatment: daily
Method: OECD Test Guideline 422

LOAEL (Lowest observable adverse effect level): 0,3 mg/kg
Application Route: Dermal
Species: rat, male/female
Exposure duration: 105 Weeks
Frequency of treatment: 5 days/week
Method: OECD Test Guideline 453

NOAEL: 0,3 mg/kg
Application Route: Dermal
Species: Mouse, male/female
Exposure duration: 105 Weeks
Frequency of treatment: 5 days/week
Method: OECD Test Guideline 453

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
NOAEL: 100 mg/kg bw/day
LOAEL (Lowest observable adverse effect level): 300 mg/kg bw/day
Application Route: Oral
Species: rat, male/female
Dose Levels: 0 - 100 - 300 - 1000 mg/kg bw/day
Method: OECD Test Guideline 408

NOAEL: 50 mg/kg bw/day
LOAEL (Lowest observable adverse effect level): 250 mg/kg bw/day
Application Route: Oral
Species: rat, male/female
Dose Levels: 0 - 50 - 250 - 750 mg/kg bw/day

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
NOAEL: 1.000 mg/kg
Application Route: Oral
Species: rat, male/female
Dose Levels: 0 - 100 - 300 - 1000 mg/kg bw/day
Frequency of treatment: daily
Method: OECD Test Guideline 407

2-hydroxyethyl acrylate
NOAEL: 0,0024 mg/l
Application Route: Inhalative
Species: rat, male/female
Exposure duration: 1,5 a
Test substance: vapour

Carcinogenicity
2-(2-Ethoxyethoxy)ethyl acrylate
No data available.

2,2-bis(acryloyloxymethyl)butyl acrylate
NOAEL (Toxicity): 50 mg/kg body weight/day
Species: Mouse, male
Application Route: Dermal
Exposure duration: 80 weeks
Frequency of treatment: 2 times/week

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
no data available

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
Species: rat, male/female
Application Route: Inhalative
Test substance: vapour
Exposure duration: 1,5 a
Result: Animal testing did not show any carcinogenic effects.

Reproductive toxicity/Fertility
2-(2-Ethoxyethoxy)ethyl acrylate
NOAEL (parents, generelly toxicity): 25 mg/kg body weight/day
NOAEL (parents, fertility): 225 mg/kg body weight/day
NOAEL (offspring): 225 mg/kg body weight/day
Test type: Combined Repeated Dose Toxicity Study with the Reproduction/Developmental Toxicity Screening Test
Species: rat, male/female
Application Route: Oral
Frequency of treatment: daily
Method: OECD Test Guideline 422

2,2-bis(acryloyloxymethyl)butyl acrylate
NOAEL - Parents: 300 mg/kg
NOAEL – F1: 300 mg/kg

Species: rat, male/female
Application Route: Oral
Frequency of treatment: daily
Method: OECD Test Guideline 422

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
NOAEL (parents, generelly toxicity): 200 mg/kg bw/day
NOAEL (parents, fertility): 60 mg/kg bw/day
NOAEL (offspring): 200 mg/kg bw/day
Test type: One-generation study
Species: rat, male/female
Application Route: Oral
Dose Levels: 0 - 60 - 200 - 600 mg/kg bw/day
Frequency of treatment: daily
Method: OECD Test Guideline 421

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
NOAEL (parents, generelly toxicity): 0,019 mg/l
NOAEL (parents, fertility): 0,269 mg/l
NOAEL (offspring): 0,092 mg/l
Test type: Two-generation study
Species: rat, male/female
Dose Levels: 0- 0,019 - 0,092 - 0,269 mg/l
Test substance: vapour
Method: OECD Test Guideline 416
Toxicological studies of a comparable product.

Reproductive toxicity/Developmental Toxicity/Teratogenicity
2-(2-Ethoxyethoxy)ethyl acrylate
NOAEL (maternal): 25 mg/kg
NOAEL (developmental toxicity): 225 mg/kg body weight/day
Species: rat, male and female
Application Route: Oral
Frequency of treatment: daily
Method: OECD Test Guideline 422

2,2-bis(acryloyloxymethyl)butyl acrylate
NOAEL (teratogenicity): >= 130 mg/kg
NOAEL (maternal): >= 130 mg/kg
NOAEL (developmental toxicity): 130 mg/kg body weight/day
Species: rabbit, male and female
Application Route: Oral
Frequency of treatment: daily
Method: OECD Test Guideline 414

NOAEL (teratogenicity): >= 130 mg/kg
NOAEL (maternal): >= 130 mg/kg
NOAEL (developmental toxicity): 130 mg/kg body weight/day
Species: rabbit, male and female
Application Route: Oral
Frequency of treatment: daily
Method: OECD Test Guideline 414

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
NOAEL (teratogenicity): 150 mg/kg bw/day
NOAEL (maternal): 150 mg/kg bw/day
LOAEL (teratogenicity): 500 mg/kg bw/day
LOAEL (maternal): 500 mg/kg bw/day
Test type: Pre-/postnatal development
Species: rat, female
Application Route: Oral
Dose Levels: 0 - 50 - 150 - 500 mg/kg bw/day
Method: OECD Test Guideline 414

NOAEL (teratogenicity): >100 mg/kg bw/day

NOAEL (maternal): >100 mg/kg bw/day
LOAEL (developmental toxicity): 100 mg/kg bw/day
Test type: Pre-/postnatal development
Species: rabbit, female
Application Route: Oral
Dose Levels: 0 - 10 - 30 - 100 mg/kg bw/day
Method: OECD Test Guideline 414

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
NOAEL (maternal): 0,0241 mg/l
NOAEL (developmental toxicity): 0,0482 mg/l
Species: rat
Test substance: vapour

Genotoxicity in vitro
2-(2-Ethoxyethoxy)ethyl acrylate
Test type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: Ames test
Test system: Escherichia coli
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with/without
Result: positive
Method: OECD Test Guideline 473

2,2-bis(acryloyloxymethyl)butyl acrylate
Test type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 473

Test type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 476

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Test type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: Ames test
Test system: Escherichia coli
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: Chromosome aberration test in vitro
Test system: Chinese hamster lung cells
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 473

Test type: Chromosome aberration test in vitro
Test system: Chinese hamster V79 cell line
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 476

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Test type: Ames test
Test system: Escherichia coli
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: Ames test
Test system: Escherichia coli
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 473

2-hydroxyethyl acrylate
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative

Test type: Micronucleus test
Test system: mouse lymphoma cells
Metabolic activation: without
Result: positive

Genotoxicity in vivo
2-(2-Ethoxyethoxy)ethyl acrylate
No data available.

2,2-bis(acryloyloxymethyl)butyl acrylate
Test type: In vivo micronucleus test
Species: Mouse, male/female
Application Route: Oral
Result: negative
Method: OECD Test Guideline 474

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
Test type: Micronucleus test
Species: Mouse
Result: negative
Method: OECD Test Guideline 474
Toxicological studies of a comparable product.

STOT evaluation – one-time exposure
2-(2-Ethoxyethoxy)ethyl acrylate
Based on available data, the classification criteria are not met.

2,2-bis(acryloyloxymethyl)butyl acrylate
Based on available data, the classification criteria are not met.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Based on available data, the classification criteria are not met.

2-hydroxyethyl acrylate
Based on available data, the classification criteria are not met.

STOT evaluation – repeated exposure
2-(2-Ethoxyethoxy)ethyl acrylate
Based on available data, the classification criteria are not met.

2,2-bis(acryloyloxymethyl)butyl acrylate
Based on available data, the classification criteria are not met.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Based on available data, the classification criteria are not met.

2-hydroxyethyl acrylate
Based on available data, the classification criteria are not met.

Aspiration toxicity

2-(2-Ethoxyethoxy)ethyl acrylate
No data available.

2,2-bis(acryloyloxymethyl)butyl acrylate
Based on available data, the classification criteria are not met.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
Based on available data, the classification criteria are not met.

CMR Assessment
2-(2-Ethoxyethoxy)ethyl acrylate
Carcinogenicity: No data available.
Mutagenicity: Based on available data, the classification criteria are not met.
Teratogenicity: No data available.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

2,2-bis(acryloyloxymethyl)butyl acrylate
Carcinogenicity: Suspected of causing cancer (Carc. 2).
Mutagenicity: Based on available data, the classification criteria are not met.
Teratogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Carcinogenicity: No data available.
Mutagenicity: Based on available data, the classification criteria are not met.
Teratogenicity: Suspected of damaging the unborn child (Repr. 2).
Reproductive toxicity/Fertility: May damage fertility (Repr. 1B).

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Carcinogenicity: No data available.
Mutagenicity: Based on available data, the classification criteria are not met.
Teratogenicity: No data available.
Reproductive toxicity/Fertility: No data available.

2-hydroxyethyl acrylate
Carcinogenicity: Based on available data, the classification criteria are not met.
Mutagenicity: Based on available data, the classification criteria are not met.
Teratogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Toxicology Assessment
2-(2-Ethoxyethoxy)ethyl acrylate
Acute effects: Harmful if swallowed. Toxic in contact with skin. Causes skin irritation. Causes serious eye irritation.
Sensitization: May cause an allergic skin reaction.

2,2-bis(acryloyloxymethyl)butyl acrylate
Acute effects: Causes skin irritation. Causes serious eye irritation.
Sensitization: May cause an allergic skin reaction.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Acute effects: Based on available data, the classification criteria are not met.
Sensitization: May cause an allergic skin reaction.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Acute effects: Causes skin irritation.
Sensitization: May cause an allergic skin reaction.

2-hydroxyethyl acrylate
Acute effects: Harmful if swallowed. Toxic in contact with skin. Causes severe skin burns and eye damage.
Sensitization: May cause an allergic skin reaction.

11.2 Information on other hazards

Endocrine disrupting properties
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 12: Ecological information

Ecotoxicological studies of the product are not available.

Do not allow to escape into waterways, wastewater or soil.

Please find below the ecotoxicological data available to us for the components.

12.1 Toxicity

Acute Fish toxicity
2-(2-Ethoxyethoxy)ethyl acrylate
LC50 > 2,5 mg/l
Species: Oncorhynchus mykiss (rainbow trout)
Exposure duration: 96 h
Method: OECD Test Guideline 203

2,2-bis(acryloyloxymethyl)butyl acrylate
LC50 0,87 mg/l
Species: Danio rerio (zebra fish)
Exposure duration: 96 h
Method: OECD Test Guideline 203

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
LC50 1,4 mg/l
Species: Cyprinus carpio (Carp)
Exposure duration: 96 h
Method: OECD Test Guideline 203

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
LC50 20 mg/l
Species: Fish
Exposure duration: 96 h
Method: OECD Test Guideline 203

2-hydroxyethyl acrylate
LC50 4,8 mg/l
Test type: Fresh water study
Species: Pimephales promelas (fathead minnow)
Exposure duration: 96 h

Chronic Fish toxicity
2-(2-Ethoxyethoxy)ethyl acrylate
No data available.

2,2-bis(acryloyloxymethyl)butyl acrylate
No data available.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
No data available.

Acute toxicity for daphnia
2-(2-Ethoxyethoxy)ethyl acrylate
EC50 90 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: OECD Test Guideline 202

2,2-bis(acryloyloxymethyl)butyl acrylate
LC50 19,9 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: Regulation (EC) No. 440/2008, Annex, C.2

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
EC50 3,53 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: OECD Test Guideline 202

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
EC50 44 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: OECD Test Guideline 202

2-hydroxyethyl acrylate
EC50 9,3 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: OECD Test Guideline 202

Chronic toxicity to daphnia
2-(2-Ethoxyethoxy)ethyl acrylate
No data available.

2,2-bis(acryloyloxymethyl)butyl acrylate
no data available

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
No data available.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
NOEC (Reproduction) 0,48 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 21 d
Method: OECD Test Guideline 211

Acute toxicity for algae
2-(2-Ethoxyethoxy)ethyl acrylate
EC50 3,2 mg/l
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h
Method: OECD Test Guideline 201

NOEC < 1 mg/l
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h
Method: OECD Test Guideline 201

2,2-bis(acryloyloxymethyl)butyl acrylate
ErC50 4,86 mg/l
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: OECD Test Guideline 201

EC50 18,8 mg/l
Species: Desmodesmus subspicatus (Green algae)
Exposure duration: 72 h
Method: Regulation (EC) No. 440/2008, Annex, C.3

EC10 1,9 mg/l
Species: Desmodesmus subspicatus (Green algae)
Exposure duration: 72 h
Method: Regulation (EC) No. 440/2008, Annex, C.3

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
EC50 > 2,01 mg/l
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h
Method: OECD Test Guideline 201

EC10 1,56 mg/l
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h

Method: OECD Test Guideline 201

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
NOEC 2 mg/l
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h
Method: OECD Test Guideline 201

EC50 37 mg/l
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h
Method: OECD Test Guideline 201

2-hydroxyethyl acrylate
EC50 6 mg/l
Test type: Fresh water study
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h
Method: OECD Test Guideline 201

NOEC 1 mg/l
Test type: Fresh water study
Species: Pseudokirchneriella subcapitata (green algae)
Exposure duration: 72 h
Method: OECD Test Guideline 201

Acute bacterial toxicity
2-(2-Ethoxyethoxy)ethyl acrylate
EC50 770 mg/l
Species: activated sludge
Exposure duration: 3 h
Method: OECD Test Guideline 209

2,2-bis(acryloyloxymethyl)butyl acrylate
EC20 625 mg/l
Species: activated sludge
Exposure duration: 0,5 h
Method: ISO 8192

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
EC50 > 1.000 mg/l
Species: activated sludge
Method: OECD Test Guideline 209

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
No data available.

2-hydroxyethyl acrylate
EC10 > 100 mg/l
Species: Sewage sludge
Exposure duration: 72 h

Ecotoxicology Assessment
2-(2-Ethoxyethoxy)ethyl acrylate
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: Toxic to aquatic life with long lasting effects.

2,2-bis(acryloyloxymethyl)butyl acrylate
Acute aquatic toxicity: Very toxic to aquatic life.
Chronic aquatic toxicity: Very toxic to aquatic life with long lasting effects.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: Toxic to aquatic life with long lasting effects.

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: Harmful to aquatic life with long lasting effects.

2-hydroxyethyl acrylate
Acute aquatic toxicity: Very toxic to aquatic life.
Chronic aquatic toxicity: Harmful to aquatic life with long lasting effects.
Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

M-Factor
2,2-bis(acryloyloxymethyl)butyl acrylate
M-factor (acute aquat. tox.): 1
M-factor (chron. aquat. tox.): 1

2-hydroxyethyl acrylate
M-factor (acute aquat. tox.): 1

12.2 Persistence and degradability

Biodegradability
2-(2-Ethoxyethoxy)ethyl acrylate
Test type: aerobic
Inoculum: activated sludge
Biodegradation: 98 %, 28 d, i.e. readily biodegradable
Method: OECD Test Guideline 301 B

2,2-bis(acryloyloxymethyl)butyl acrylate
Test type: aerobic
Inoculum: activated sludge
Biodegradation: 82 - 90 %, 28 d, i.e. readily biodegradable
Method: OECD Test Guideline 301 B

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Test type: aerobic
Inoculum: activated sludge, non-adapted
Biodegradation: 0 - 10 %, 28 d, i.e. not readily degradable
Method: OECD Test Guideline 301 F

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
Test type: aerobic
Inoculum: activated sludge
Biodegradation: 0 %, 28 d, i.e. not readily degradable
Method: OECD Test Guideline 301 B
Studies of a comparable product.

2-hydroxyethyl acrylate
Biodegradation: 79 %, 28 d, i.e. readily biodegradable
Method: OECD Test Guideline 301 B

12.3 Bioaccumulative potential

Bioaccumulation
2-(2-Ethoxyethoxy)ethyl acrylate
no data available

2,2-bis(acryloyloxymethyl)butyl acrylate
Bioconcentration factor (BCF): 123
Method: (calculated)
Accumulation in aquatic organisms is unlikely.

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
Bioconcentration factor (BCF): 18 - 22
Species: Cyprinus carpio (Carp)
Exposure duration: 8 Weeks

2-Propenoic acid, 2-hydroxyethyl ester, reaction products with TDI
no data available

2-hydroxyethyl acrylate
no data available

Partition coefficient (n−octanol/water)
2-hydroxyethyl acrylate

log Pow: 0,21

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide
The product contains none organically bound halogens.

SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. Reference number 2008/98/EC

Dispose in accordance with applicable international, national and local laws, ordinances and statutes. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used. The classification of the product may meet the criteria for a hazardous waste. Offer surplus and non-recyclable solutions to a licensed disposal company. Do not dispose of waste into sewer.

13.1 Waste treatment methods

After containers have been emptied as thoroughly as possible (e.g. by pouring, scraping or draining until "drip-dry"), they can be sent to an appropriate collection point set up within the framework of the existing take-back scheme of the chemical industry. Empty containers retain residue and can be dangerous. Containers must be recycled in compliance with national legislation and environmental regulations. Dispose of empty containers and wastes safely. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Where possible recycling is preferred to disposal or incineration.

No disposal into waste water.

SECTION 14: Transport information

ADR/RID

14.1 UN number or ID number	:	UN 3082
14.2 UN proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (2-(2-Ethoxyethoxy)ethyl acrylate, Trimethylolpropane triacrylate)
14.3 Transport hazard class(es)	:	9
Hazard Identification Number	:	90
14.4 Packing group	:	III
14.5 Environmental hazards	:	yes

Limited quantity regulations applicable in accordance with chapter 3.4 ADR/RID in compliance with threshold value

ADN

14.1 UN number or ID number	:	UN 3082
14.2 UN proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (2-(2-Ethoxyethoxy)ethyl acrylate, Trimethylolpropane triacrylate)
14.3 Transport hazard class(es)	:	9
Hazard Identification Number	:	90
14.4 Packing group	:	III
14.5 Environmental hazards	:	yes

This classification data does not apply to transportation by tanker. If required, additional information can be requested from the manufacturer.

IATA

14.1 UN number or ID number	:	UN 3082
14.2 UN proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (2-(2-Ethoxyethoxy)ethyl acrylate, Trimethylolpropane triacrylate)
14.3 Transport hazard class(es)	:	9
14.4 Packing group	:	III
14.5 Environmental hazards	:	yes

IMDG

14.1 UN number or ID number	:	UN 3082
14.2 UN proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (2-(2-Ethoxyethoxy)ethyl acrylate, Trimethylolpropane triacrylate)
14.3 Transport hazard class(es)	:	9
14.4 Packing group	:	III
14.5 Environmental hazards	:	Marine pollutant
EmS Code	:	F-A - S-F
Segregation Group IMDG	:	not applicable

14.6 Special precautions for user

See section 6 - 8.

Additional information	:	Environmentally hazardous substance. Keep separated from foodstuffs.

14.7 Maritime transport in bulk according to IMO instruments

Product is not transported by us in bulk.

SECTION 15: Regulatory information

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

Candidate List of Substances of Very High Concern for Authorisation
This product contains substances identified as SVHC according to REACH Regulation (EC) no. 1907/2006, Article 59. Please refer to section 3.

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.
E2 Environmental hazards

Quantity1:	200 t	Quantity2:	500 t

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)
Conditions of restriction for the following entries should be considered: 3

TA Luft List (Germany)
Type: 5.2.1 Total dust
Fraction of other substances: 0,87 %

Type: 5.2.5 Organic Substances
portion Class 1: 24,04 %

Fraction of other substances: 75 %

Type: 5.2.7.1.3 Substances toxic to reproduction
Fraction of other substances: 2 %

Water contaminating class (Germany)
3 highly hazardous to water
Classification according to AwSV, Annex 1 (5.2)

Other regulations
Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.
Take note of Law on the protection of mothers at work, in education and in studies (Maternity Protection Act - MuSchG).
The product is subject to the supply restrictions of the German Ordinance on the Prohibition of Chemicals

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for:
2-(2-Ethoxyethoxy)ethyl acrylate
2,2-bis(acryloyloxymethyl)butyl acrylate

SECTION 16: Other information

Full text of the hazard statements of the CLP classification (1272/2008/CE) referred to under sections 2, 3 and 10.

H302	Harmful if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H360F	May damage fertility.
H360Fd	May damage fertility. Suspected of damaging the unborn child.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

Abbreviations and acronyms

ADN	Accord européen relatif au transport international des marchandises Dangereuses par voie de Navigation intérieure
ADR	Accord européen relatif au transport international des marchandises Dangereuses par Route
ANSI	American National Standards Institute
ASTM	American Society of Testing and Materials (US)
ATE	Acute Toxic Estimate
AwSv	Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen
BCF	Bioconcentration Factor
CAS	Chemical Abstract Service
CLP	Regulation on Classification, Labelling and Packaging of Substances and Mixtures
CMR	Cancerogenic Mutagenic Reprotoxic
DIN	Deutsches Institut für Normung
DNEL	Derived No-Effect Level
EC…	Effect Concentration ... %
EWC	European Waste Catalogue
IATA	International Air Transport Association
IBC	Intermediate Bulk Container
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LOAEL	Lowest Observable Adverse Effect Level
LC…	Lethal Concentration, ...%
LD…	Lethal Dose, ...%
MARPOL	International Convention for the Prevention of Pollution From Ships
NOAEL	No Observed Adverse Effect Level
NOEL/NOEC	No Observed Effect Level/Concentration
OECD	Organisation for Economic Co-operation and Development
PBT	persistent, bioaccumulative, toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Règlement concernant le transport International ferroviaire de marchandises Dangereuses
STOT	Specific Target Organ Toxicity
TRGS	Technische Regeln für Gefahrstoffe
vPvB	very Persistent, very Bioaccumulative
WGK	Wassergefährdungsklasse

Relevant changes since the last version are highlighted in the margin. This version replaces all previous versions.

Further information

Classification of the mixture:	Classification procedure:
Skin Irrit. 2 H315	Calculation method
Eye Irrit. 2 H319	Calculation method
Skin Sens. 1 H317	Calculation method
Carc. 2 H351	Calculation method
Repr. 1B H360F	Calculation method
Aquatic Chronic 2 H411	Calculation method

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.

Annex

The operational conditions and the implementation of Risk Management Measures (RMM) are dependent on the following priority-/lead substances for the respective exposure routes:

Lead substance(s), aquatic environment:
2-(2-Ethoxyethoxy)ethyl acrylate

Lead substance(s), ozone layer:
Not relevant

Priority substance(s), Health:
2,2-bis(acryloyloxymethyl)butyl acrylate

Local effects, Skin:
2-(2-Ethoxyethoxy)ethyl acrylate
For RMMs see chapter 8 of the SDS.

Local effects, Inhalation:
Not relevant

Local effects, Eyes:
2-(2-Ethoxyethoxy)ethyl acrylate
RMMs/OCs for component(s) driving the hazards for local effects are sufficiently covered by the priority substance(s).

Exposure Scenario

Number	Title
ES1	Formulation or re-packing
ES2	Use at industrial sites; Industrial application of coatings and inks; (dry processes).
ES3	Use at industrial sites; Polymerisation; Use in polymer production.
ES4	Widespread use by professional workers

ES1: Formulation or re-packing

1.1. Title section

Exposure Scenario name	:	Formulation of preparations, Blending, Repacking, (dry processes), Coatings, inks
Structured Short Title	:	Formulation or re-packing

Environment		
CS1	**Formulation or re-packing, Mixing operations, (dry processes), Coatings, inks** [2-(2-Ethoxyethoxy)ethyl acrylate]	ERC2
Worker		
CS2	**Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC1
CS3	**Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC2
CS4	**Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC3
CS5	**Mixing or blending in batch processes** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC5
CS6	**Transfer of substance or mixture (charging/discharging) at non dedicated-facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8a
CS7	**Transfer of substance or mixture (charging/discharging) at dedicated facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8b
CS8	**Transfer of substance or mixture into small containers (dedicated filling line, including weighing)** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC9
CS9	**Use as laboratory reagent** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Formulation into mixture (ERC2) [2-(2-Ethoxyethoxy)ethyl acrylate]

Product (article) characteristics		
Vapour pressure	:	< 10 Pa
Biodegradation	:	Readily biodegradable.
Amount used, frequency and duration of use (or from service life)		
Annual amount per site	:	50 tonnes/year

Emission days	:	10
Remarks	:	days/year
Technical and organisational conditions and measures		
No emission to wastewater, air and soil. Dry processes		
Conditions and measures related to sewage treatment plant		
Remarks	:	Dry processes, Wastewater emission controls are not applicable as there is no direct release to wastewater.
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

1.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

1.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

1.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Advanced.
Local exhaust ventilation Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.
Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

1.2.5. Control of worker exposure: Mixing or blending in batch processes (PROC5) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid

Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Advanced.
Local exhaust ventilation Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

1.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

1.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol

Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 95 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	3 - 5
Temperature	:	<= 60 °C

1.2.8. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.
Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

1.2.9. Control of worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Formulation into mixture (ERC2) [2-(2-Ethoxyethoxy)ethyl acrylate]

Release route	Release rate	Release estimation method	Remarks
Air	0 kg/day	OECD ESD, No. 22	
Soil	0 kg/day	OECD ESD, No. 22	

Compartment	Exposure level	RCR	Remarks
Freshwater	3,2 µg/L (CHESAR, 3)	< 0,01	
Marine water	0,32 µg/L (CHESAR, 3)	< 0,01	

Additional information on exposure estimation
Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR ≤ 1).

1.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	0,124 mg/m³ (ECETOC TRA worker v3)	0,007	
inhalative, local, long-term	0,124 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,000992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,000992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	
inhalative, local, long-term	1,235 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,137 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,02 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,02 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation

Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	
inhalative, local, long-term	2,222 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,02 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,02 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.3.5. Worker exposure: Mixing or blending in batch processes (PROC5) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	≤ 1 h/day
inhalative, local, long-term	1,235 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	6,17 mg/m³ (ECETOC TRA worker v3)	0,36	> 1 h - ≤ 8 h/day
inhalative, local, long-term	6,17 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	1,371 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	≤ 1 h/day
dermal, systemic, long-term	1,371 mg/kg bw/day (ECETOC TRA worker v3)	0,003	> 1 h - ≤ 8 h/day
dermal, local, long-term	0,2 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,2 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,469 mg/m³ (ECETOC TRA worker v3)	0,145	≤ 1 h/day
inhalative, local, long-term	2,469 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	12,35 mg/m³ (ECETOC TRA worker v3)	0,73	> 1 h - ≤ 8 h/day
inhalative, local, long-term	12,35 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	1,371 mg/kg bw/day (ECETOC TRA worker v3)	0,003	
dermal, local, long-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,161 mg/m³ (ECETOC TRA worker v3)	0,127	
inhalative, local, long-term	2,161 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	1,371 mg/kg bw/day (ECETOC TRA worker v3)	0,003	
dermal, local, long-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.3.8. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	≤ 1 h/day
inhalative, local, long-term	1,235 mg/m³ (ECETOC		≤ 1 h/day, Qualitative

	TRA worker v3)		approach used to conclude safe use.
inhalative, systemic, long-term	6,17 mg/m³ (ECETOC TRA worker v3)	0,36	> 1 h - ≤ 8 h/day
inhalative, local, long-term	6,17 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,686 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.3.9. Worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	≤ 1 h/day
inhalative, local, long-term	1,235 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	3,7 mg/m³ (ECETOC TRA worker v3)	0,22	> 1 h - ≤ 4 h/day
inhalative, local, long-term	3,7 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 4 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,00992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,00992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.
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.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

ES2: Use at industrial sites; Industrial application of coatings and inks; (dry processes).

2.1. Title section

Exposure Scenario name	:	Industrial application of coatings and inks, (dry processes)
Structured Short Title	:	Use at industrial sites; Industrial application of coatings and inks; (dry processes).

Environment		
CS1	**Application of:, Coatings, inks, (dry processes)** [2-(2-Ethoxyethoxy)ethyl acrylate]	ERC5
CS2	**Use as monomer** [2-(2-Ethoxyethoxy)ethyl acrylate]	ERC6c
Worker		
CS3	**Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC1
CS4	**Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC2
CS5	**Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC3
CS6	**Mixing or blending in batch processes** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC5
CS7	**Transfer of substance or mixture (charging/discharging) at non dedicated-facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8a
CS8	**Transfer of substance or mixture (charging/discharging) at dedicated facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8b
CS9	**Transfer of substance or mixture into small containers (dedicated filling line, including weighing)** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC9
CS10	**Roller application or brushing** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC10
CS11	**Treatment of articles by dipping and pouring** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC13
CS12	**Use as laboratory reagent** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC15

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Use at industrial site leading to inclusion into/onto article (ERC5) [2-(2-Ethoxyethoxy)ethyl acrylate]

Product (article) characteristics		
Vapour pressure	:	< 10 Pa

Biodegradation	:	Readily biodegradable.
Amount used, frequency and duration of use (or from service life)		
Annual amount per site	:	6 tonnes/year
Technical and organisational conditions and measures		
No emission to wastewater, air and soil. Dry processes		
Conditions and measures related to sewage treatment plant		
Remarks	:	Dry processes, Wastewater emission controls are not applicable as there is no direct release to wastewater.
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2.2. Control of environmental exposure: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6c)
[2-(2-Ethoxyethoxy)ethyl acrylate]

Product (article) characteristics		
Vapour pressure	:	< 10 Pa
Biodegradation	:	Readily biodegradable.
Amount used, frequency and duration of use (or from service life)		
Annual amount per site	:	2 tonnes/year
Technical and organisational conditions and measures		
No emission to wastewater, air and soil. Dry processes		
Conditions and measures related to sewage treatment plant		
Remarks	:	Dry processes, Wastewater emission controls are not applicable as there is no direct release to wastewater.
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

2.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol

Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection.		

Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.6. Control of worker exposure: Mixing or blending in batch processes (PROC5) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		

Local exhaust ventilation Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.
Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 95 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use

Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.9. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.10. Control of worker exposure: Roller application or brushing (PROC10)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid

Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.11. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn		

Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.2.12. Control of worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid

Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Advanced.
Local exhaust ventilation Inhalation - minimum efficiency of 90 %

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Use at industrial site leading to inclusion into/onto article (ERC5) [2-(2-Ethoxyethoxy)ethyl acrylate]

Release route	Release rate	Release estimation method	Remarks
Air	0 kg/day	OECD ESD, No. 22	
Soil	0 kg/day	OECD ESD, No. 22	

Compartment	Exposure level	RCR	Remarks
Freshwater	3,2 µg/L (CHESAR, 3)	< 0,01	
Marine water	0,32 µg/L (CHESAR, 3)	< 0,01	

Additional information on exposure estimation
Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR ≤ 1).

2.3.2. Environmental release and exposure: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6c)
[2-(2-Ethoxyethoxy)ethyl acrylate]

Release route	Release rate	Release estimation method	Remarks
Air	0,035 kg/day	EU TGD Tabelle A3.10	
Soil	0 kg/day	EU TGD Tabelle A3.10	

Compartment	Exposure level	RCR	Remarks
Freshwater	3,2 µg/L (CHESAR, 3)	< 0,01	
Marine water	0,32 µg/L (CHESAR, 3)	< 0,01	

Additional information on exposure estimation
Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR ≤ 1).

2.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	0,074 mg/m³ (ECETOC TRA worker v3)	0,004	
inhalative, local, long-term	0,074 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,00204 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,000595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,000595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks

inhalative, systemic, long-term	0,741 mg/m³ (ECETOC TRA worker v3)	0,044	
inhalative, local, long-term	0,741 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,082 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,012 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,012 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	
inhalative, local, long-term	2,222 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,012 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,012 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.6. Worker exposure: Mixing or blending in batch processes (PROC5) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	
inhalative, local, long-term	2,222 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,482 mg/m³ (ECETOC TRA worker v3)	0,087	≤ 1 h/day
inhalative, local, long-term	1,482 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	7,41 mg/m³ (ECETOC TRA worker v3)	0,44	> 1 h - ≤ 8 h/day
inhalative, local, long-term	7,41 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,852 mg/m³ (ECETOC TRA worker v3)	0,109	
inhalative, local, long-term	1,852 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.9. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	≤ 4 h/day
inhalative, local, long-term	2,222 mg/m³ (ECETOC		≤ 4 h/day, Qualitative

	TRA worker v3)		approach used to conclude safe use.
inhalative, systemic, long-term	3,7 mg/m³ (ECETOC TRA worker v3)	0,23	> 4 h - ≤ 8 h/day
inhalative, local, long-term	3,7 mg/m³ (ECETOC TRA worker v3)		> 4 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,412 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.10. Worker exposure: Roller application or brushing (PROC10) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,482 mg/m³ (ECETOC TRA worker v3)	0,088	≤ 1 h/day
inhalative, local, long-term	1,482 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	7,41 mg/m³ (ECETOC TRA worker v3)	0,44	> 1 h - ≤ 8 h/day
inhalative, local, long-term	7,41 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	1,646 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.11. Worker exposure: Treatment of articles by dipping and pouring (PROC13) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	7,41 mg/m³ (ECETOC TRA worker v3)	0,44	
inhalative, local, long-term	7,41 mg/m³ (ECETOC TRA		Qualitative approach used

	worker v3)		to conclude safe use.
dermal, systemic, long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.3.12. Worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	
inhalative, local, long-term	2,222 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,02 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,00595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,00595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

ES3: Use at industrial sites; Polymerisation; Use in polymer production.

3.1. Title section

Exposure Scenario name	:	Polymerisation, Use in polymer production
Structured Short Title	:	Use at industrial sites; Polymerisation; Use in polymer production.

Environment		
CS1	**Application of:, Coatings, inks, (dry processes)** [2-(2-Ethoxyethoxy)ethyl acrylate]	ERC5
CS2	**Use as monomer** [2-(2-Ethoxyethoxy)ethyl acrylate]	ERC6c
Worker		
CS3	**Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC1
CS4	**Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC3
CS5	**Chemical production where opportunity for exposure arises** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC4
CS6	**Transfer of substance or mixture (charging/discharging) at non dedicated-facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8a
CS7	**Transfer of substance or mixture (charging/discharging) at dedicated facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8b
CS8	**Transfer of substance or mixture into small containers (dedicated filling line, including weighing)** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC9
CS9	**Tabletting, compression, extrusion, pelettisation, granulation** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC14
CS10	**Use as laboratory reagent** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC15

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Use at industrial site leading to inclusion into/onto article (ERC5) [2-(2-Ethoxyethoxy)ethyl acrylate]

Product (article) characteristics		
Vapour pressure	:	< 10 Pa
Biodegradation	:	Readily biodegradable.
Amount used, frequency and duration of use (or from service life)		
Annual amount per site	:	6 tonnes/year

Technical and organisational conditions and measures		
No emission to wastewater, air and soil. Dry processes		
Conditions and measures related to sewage treatment plant		
Remarks	:	Dry processes, Wastewater emission controls are not applicable as there is no direct release to wastewater.
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

3.2.2. Control of environmental exposure: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6c)
[2-(2-Ethoxyethoxy)ethyl acrylate]

Product (article) characteristics		
Vapour pressure	:	< 10 Pa
Biodegradation	:	Readily biodegradable.
Amount used, frequency and duration of use (or from service life)		
Annual amount per site	:	2 tonnes/year
Technical and organisational conditions and measures		
No emission to wastewater, air and soil. Dry processes		
Conditions and measures related to sewage treatment plant		
Remarks	:	Dry processes, Wastewater emission controls are not applicable as there is no direct release to wastewater.
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

3.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		

Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.2.5. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol

Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 95 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.
Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.2.8. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid

Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Advanced.
Local exhaust ventilation Inhalation - minimum efficiency of 90 %

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.
Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.2.9. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Advanced.		
Local exhaust ventilation Inhalation - minimum efficiency of 90 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.2.10. Control of worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 100%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		

Occupational Health and Safety Management System: Advanced.
Local exhaust ventilation Inhalation - minimum efficiency of 90 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.
Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Use at industrial site leading to inclusion into/onto article (ERC5) [2-(2-Ethoxyethoxy)ethyl acrylate]

Release route	Release rate	Release estimation method	Remarks
Air	0 kg/day	OECD ESD, No. 22	
Soil	0 kg/day	OECD ESD, No. 22	

Compartment	Exposure level	RCR	Remarks
Freshwater	3,2 µg/L (CHESAR, 3)	< 0,01	
Marine water	0,32 µg/L (CHESAR, 3)	< 0,01	

Additional information on exposure estimation
Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR ≤ 1).

3.3.2. Environmental release and exposure: Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6c) [2-(2-Ethoxyethoxy)ethyl acrylate]

Release route	Release rate	Release estimation method	Remarks
Air	0,035 kg/day	EU TGD Tabelle A3.10	
Soil	0 kg/day	EU TGD Tabelle A3.10	

Compartment	Exposure level	RCR	Remarks
Freshwater	3,2 µg/L (CHESAR, 3)	< 0,01	
Marine water	0,32 µg/L (CHESAR, 3)	< 0,01	

Additional information on exposure estimation

Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR ≤ 1).

3.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	0,124 mg/m³ (ECETOC TRA worker v3)	0,007	
inhalative, local, long-term	0,124 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,0034 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,000992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,000992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	
inhalative, local, long-term	2,222 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,069 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,02 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,02 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.3.5. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	≤ 1 h/day
inhalative, local, long-term	1,235 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	3,7 mg/m³ (ECETOC TRA worker v3)	0,22	> 1 h - ≤ 4 h/day
inhalative, local, long-term	3,7 mg/m³ (ECETOC TRA		> 1 h - ≤ 4 h/day, Qualitative

	worker v3)		approach used to conclude safe use.
dermal, systemic, long-term	0,686 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,469 mg/m³ (ECETOC TRA worker v3)	0,145	≤ 1 h/day
inhalative, local, long-term	2,469 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	12,35 mg/m³ (ECETOC TRA worker v3)	0,73	> 1 h - ≤ 8 h/day
inhalative, local, long-term	12,35 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	1,371 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	3,087 mg/m³ (ECETOC TRA worker v3)	0,182	
inhalative, local, long-term	3,087 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	1,371 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

dermal, local, short-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.3.8. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	≤ 1 h/day
inhalative, local, long-term	1,235 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	6,17 mg/m³ (ECETOC TRA worker v3)	0,36	> 1 h - ≤ 8 h/day
inhalative, local, long-term	6,17 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,686 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,1 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.3.9. Worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	≤ 1 h/day
inhalative, local, long-term	1,235 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	6,17 mg/m³ (ECETOC TRA worker v3)	0,36	> 1 h - ≤ 8 h/day
inhalative, local, long-term	6,17 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,343 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,05 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

dermal, local, short-term	0,05 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.3.10. Worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,235 mg/m³ (ECETOC TRA worker v3)	0,073	≤ 1 h/day
inhalative, local, long-term	1,235 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	6,17 mg/m³ (ECETOC TRA worker v3)	0,36	> 1 h - ≤ 8 h/day
inhalative, local, long-term	6,17 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,034 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,00992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,00992 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

ES4: Widespread use by professional workers

4.1. Title section

Exposure Scenario name	:	Use of formulations/compounds
Structured Short Title	:	Widespread use by professional workers

Environment		
CS1	**Application of Formulation:, Coatings, inks, Adhesives** [2-(2-Ethoxyethoxy)ethyl acrylate]	ERC8c
Worker		
CS2	**Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC1
CS3	**Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC3
CS4	**Mixing or blending in batch processes** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC5
CS5	**Transfer of substance or mixture (charging/discharging) at non dedicated-facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8a
CS6	**Transfer of substance or mixture (charging/discharging) at dedicated facilities** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC8b
CS7	**Transfer of substance or mixture into small containers (dedicated filling line, including weighing)** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC9
CS8	**Roller application or brushing** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC10
CS9	**Use as laboratory reagent** [2,2-bis(acryloyloxymethyl)butyl acrylate]	PROC15

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Widespread use leading to inclusion into/onto article (indoor) (ERC8c)
[2-(2-Ethoxyethoxy)ethyl acrylate]

Product (article) characteristics		
Vapour pressure	:	< 10 Pa
Biodegradation	:	Readily biodegradable.
Amount used, frequency and duration of use (or from service life)		
Daily amount for wide dispersive uses	:	0,00055 kg/day
Exposure Type	:	Continuous release
Emission days	:	365

Remarks	:	days/year
Technical and organisational conditions and measures		
Soil emission controls are not applicable as there is no direct release to soil. No emission to wastewater, air and soil.		
Conditions and measures related to sewage treatment plant		
STP type	:	Municipal Sewage Treatment Plant
Effectiveness (of a measure)	:	87,36 %
Conditions and measures related to treatment of waste (including article waste)		
Waste treatment	:	External treatment and disposal of waste should comply with applicable local and/or national regulations.

4.2.2. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Basic.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.2.3. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Basic.		
Local exhaust ventilation Inhalation - minimum efficiency of 80 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.2.4. Control of worker exposure: Mixing or blending in batch processes (PROC5) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 1 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Basic.
Local exhaust ventilation Inhalation - minimum efficiency of 80 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.
Other conditions affecting workers exposure

Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid

Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Basic.
Local exhaust ventilation Inhalation - minimum efficiency of 80 %
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed.

Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid

Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Basic.
Local exhaust ventilation Inhalation - minimum efficiency of 90 %

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.2.7. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics

Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Basic.		
Local exhaust ventilation Inhalation - minimum efficiency of 80 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %		
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.		
Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.2.8. Control of worker exposure: Roller application or brushing (PROC10) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid
Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 4 hours/day
Technical and organisational conditions and measures		
Occupational Health and Safety Management System: Basic.		
Local exhaust ventilation Inhalation - minimum efficiency of 80 %		

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable respiratory protection. Inhalation - minimum efficiency of 90 %
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use
Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.2.9. Control of worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Product (article) characteristics		
Concentration of the Substance in Mixture/Article	:	<= 25%
Molar Mass	:	296,3 g/mol
Vapour pressure	:	2 Pa at 60 °C
Physical form of product	:	Liquid

Amount used, frequency and duration of use (or from service life)		
Duration of the activity	:	<= 8 hours/day

Technical and organisational conditions and measures
Occupational Health and Safety Management System: Basic.
Local exhaust ventilation Inhalation - minimum efficiency of 80 %

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Dermal - minimum efficiency of 90 %
Use suitable eye protection. Depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn Contaminated and/or damaged gloves must be changed. Wash off any skin contamination immediately. Supervision in place to check that the risk management measures in place are being used correctly and operational conditions are being followed.

Other conditions affecting workers exposure		
Indoor or outdoor use	:	Indoor use

Ventilation rate per hour	:	1 - 3
Temperature	:	<= 60 °C

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Widespread use leading to inclusion into/onto article (indoor) (ERC8c)
[2-(2-Ethoxyethoxy)ethyl acrylate]

Release route	Release rate	Release estimation method	Remarks
Air	0,0000825 kg/day	OECD ESD, No. 22	
Soil	0 kg/day	OECD ESD, No. 22	

Compartment	Exposure level	RCR	Remarks
Freshwater	3,2 µg/L (CHESAR, 3)	< 0,01	
Marine water	0,32 µg/L (CHESAR, 3)	< 0,01	

Additional information on exposure estimation
Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR ≤ 1).

4.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	0,074 mg/m³ (ECETOC TRA worker v3)	0,0041	
inhalative, local, long-term	0,074 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,00204 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,000595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,000595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.3.3. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,667 mg/m³ (ECETOC TRA worker v3)	0,157	
inhalative, local, long-term	2,667 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,041 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,012 mg/cm² (ECETOC		Qualitative approach used

	TRA worker v3)		to conclude safe use.
dermal, local, short-term	0,012 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.3.4. Worker exposure: Mixing or blending in batch processes (PROC5)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,963 mg/m³ (ECETOC TRA worker v3)	0,174	
inhalative, local, long-term	2,963 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	
inhalative, local, long-term	2,222 mg/m³ (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,482 mg/m³ (ECETOC TRA worker v3)	0,087	≤ 1 h/day
inhalative, local, long-term	1,482 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude

			safe use.
inhalative, systemic, long-term	7,41 mg/m³ (ECETOC TRA worker v3)	0,44	> 1 h - ≤ 8 h/day
inhalative, local, long-term	7,41 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,823 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,963 mg/m³ (ECETOC TRA worker v3)	0,174	≤ 1 h/day
inhalative, local, long-term	2,963 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	14,82 mg/m³ (ECETOC TRA worker v3)	0,87	> 1 h - ≤ 8 h/day
inhalative, local, long-term	14,82 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,412 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,06 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.3.8. Worker exposure: Roller application or brushing (PROC10)
[2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	2,222 mg/m³ (ECETOC TRA worker v3)	0,131	
inhalative, local, long-term	2,222 mg/m³ (ECETOC		Qualitative approach used

	TRA worker v3)		to conclude safe use.
dermal, systemic, long-term	1,646 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,12 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.3.9. Worker exposure: Use as laboratory reagent (PROC15) [2,2-bis(acryloyloxymethyl)butyl acrylate]

Exposure route	Exposure level	RCR	Remarks
inhalative, systemic, long-term	1,482 mg/m³ (ECETOC TRA worker v3)	0,087	≤ 1 h/day
inhalative, local, long-term	1,482 mg/m³ (ECETOC TRA worker v3)		≤ 1 h/day, Qualitative approach used to conclude safe use.
inhalative, systemic, long-term	7,41 mg/m³ (ECETOC TRA worker v3)	0,44	> 1 h - ≤ 8 h/day
inhalative, local, long-term	7,41 mg/m³ (ECETOC TRA worker v3)		> 1 h - ≤ 8 h/day, Qualitative approach used to conclude safe use.
dermal, systemic, long-term	0,02 mg/kg bw/day (ECETOC TRA worker v3)	< 0,01	
dermal, local, long-term	0,00595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.
dermal, local, short-term	0,00595 mg/cm² (ECETOC TRA worker v3)		Qualitative approach used to conclude safe use.

Additional information on exposure estimation
Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.
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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
If further details are needed, please contact us.