Safety Data Sheet
POLURENE 7581

Version:4 Revision date: 10/4/2019

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

1.1. Product identifier
Trade name:
POLURENE 7581

1.2. Relevant identified uses of the substance or mixture and uses advised against
Recommended use: Hardener for coating materials or adhesives for industrial and trade applications.
Uses advised against: Not suitable for DIY use.

1.3. Details of the supplier of the safety data sheet
S.A.P.I.C.I. Spa Via Bergamo, 2 - 20063 Cernusco s/N (MI)
Tel +39 02 921871 Fax +39 02 92102331
Responsible for the safety data sheet: HSE@sapici.it

1.4. Emergency telephone number
National Poison Information Service (NPIS).
UK NPIS 0344 892 0111 (24 hour service)
National Poison Information Center of Ireland (NPIC)
Beaumont Hospital - PO Box 1297 - Beaumont Road - Dublin 9
Healthcare Professionals: +353 (01) 809 2566 (24 hour service)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
EC regulation criteria 1272/2008 (CLP):

 Warning, Flam. Liq. 3, Flammable liquid and vapour.

 Warning, Eye Irrit. 2, Causes serious eye irritation.

 Danger, Resp. Sens. 1, May cause allergy or asthma symptoms or breathing difficulties if inhaled.

 Warning, Skin Sens. 1, May cause an allergic skin reaction.

 Warning, STOT SE 3, May cause drowsiness or dizziness.

EUH066 Repeated exposure may cause skin dryness or cracking.
Adverse physicochemical, human health and environmental effects:
No other hazards

2.2. Label elements
Labelling (1272/2008/CE):

Hazard pictograms:

Danger

Hazard statements:

H226 Flammable liquid and vapour.
H319 Causes serious eye irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317 May cause an allergic skin reaction.
H336 May cause drowsiness or dizziness.

Precautionary statements:

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves. Wear eye or face protection.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
P370+P378 In case of fire: Use powder, foam or CO2 for extinction.
P403+P235 Store in a well-ventilated place. Keep cool.

Special Provisions:

EUH066 Repeated exposure may cause skin dryness or cracking.
EUH204 Contains isocyanates. May produce an allergic reaction.

Contains

toluene diisocyanate polymer
n-butyl acetate
m-tolylidene diisocyanate; toluene-diisocyanate

Special provisions according to Annex XVII of REACH and subsequent amendments:

None

2.3. Other hazards

vPvB Substances: None - PBT Substances: None

No other hazards

SECTION 3: Composition/information on ingredients

3.1. Substances

N.A.

3.2. Mixtures

Hazardous components within the meaning of the CLP regulation and related classification:

Qty	Name	Ident. Number	Classification
~50%	toluene diisocyanate polymer	CAS: 9017-01-0	3.3/2 Eye Irrit. 2 H319 3.4.2/1-1A-1B Skin Sens. 1,1A,1B H317
~50%	n-butyl acetate	Index number: 607-025-00-1 CAS: 123-86-4	2.6/3 Flam. Liq. 3 H226 3.8/3 STOT SE 3 H336

		EC: REACH No.:	204-658-1 01-2119485493-29	EUH066
<0.5 %	m-tolylidene diisocyanate; toluene-diisocyanate	Index number: CAS: EC: REACH No.:	615-006-00-4 26471-62-5 247-722-4 01-2119454791-34	3.1/1/Inhal Acute Tox. 1 H330 3.2/2 Skin Irrit. 2 H315 3.3/2 Eye Irrit. 2 H319 3.4.1/1 Resp. Sens. 1 H334 3.4.2/1 Skin Sens. 1 H317 3.6/2 Carc. 2 H351 3.8/3 STOT SE 3 H335 4.1/C3 Aquatic Chronic 3 H412 Specific Concentration Limits: C >= 0,1%: Resp. Sens. 1 H334

SECTION 4: First aid measures

4.1. Description of first aid measures

In case of skin contact:
Remove contaminated clothing immediately and dispose off safely.
Areas of the body that have - or are only even suspected of having - come into contact with the product must be rinsed immediately with plenty of running water and possibly with soap.
Wash thoroughly the body (shower or bath).
After contact with skin, wash immediately with soap and plenty of water.

In case of eyes contact:
After contact with the eyes, rinse with water with the eyelids open for a sufficient length of time, then consult an opthalmologist immediately.
Protect uninjured eye.

In case of Ingestion:
Do not under any circumstances induce vomiting. OBTAIN A MEDICAL EXAMINATION IMMEDIATELY.

In case of Inhalation:
Remove casualty to fresh air and keep warm and at rest.
In case of unwellness, seek medical advice immediately.

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

None.

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

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).
Treatment:
None.

SECTION 5: Firefighting measures

5.1. Extinguishing media
Suitable extinguishing media:
Fire extinguishing powder, foam or CO2. Use foam and water jets only in case of extensive fire outbreak.
Extinguishing media which must not be used for safety reasons: high volume water jet.

5.2. Special hazards arising from the substance or mixture
Burning produces heavy smoke.
Do not inhale combustion gases in case of a fire.

5.3. Advice for firefighters
Use suitable breathing apparatus.
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Move undamaged containers from immediate hazard area if it can be done safely.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Wear personal protection equipment.
Remove all sources of ignition.
Remove persons to safety.
See protective measures under point 7 and 8.

6.2. Environmental precautions
Do not allow to escape into waterways, wastewater or soil.
Retain contaminated washing water and dispose it in compliance with the local and national regulations currently in force.
In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.

6.3. Methods and material for containment and cleaning up
Cover the spilling with wet, absorbent material (e.g. sawdust, chemical binder based on calcium silicate hydrate, sand) and remove mechanically.
After approx. one hour transfer to waste container and do not seal (evolution of CO2!). Keep damp in a safe ventilated area for several days.

6.4. Reference to other sections
See also section 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid contact with skin and eyes, inhalation of vapours and mists.
Don't use empty container before they have been cleaned.
Before making transfer operations, assure that there aren't any incompatible material residuals in the containers.
Contamined clothing should be changed before entering eating areas.
See also section 8 for recommended protective equipment.

7.2. Conditions for safe storage, including any incompatibilities

Always keep in a cool and well ventilated place.
Store at below 45 °C. Keep away from unguarded flame and heat sources. Avoid direct exposure to sunlight.
Keep away from unguarded flame, sparks, and heat sources.
Keep away from food, drink and feed.
Further information on the storage conditions which must be observed to preserve quality can be found in our product information sheet.

7.3. Specific end use(s)

None in particular.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

n-butyl acetate - CAS: 123-86-4

OEL - TWA: 710 mg/m3, 150 ppm - STEL: 1420 mg/m3, 300 ppm - Notes: DENMARK
OEL - TWA: 720 mg/m3, 150 ppm - STEL: 960 mg/m3, 200 ppm - Notes: FINLAND
OEL - TWA: 710 mg/m3, 150 ppm - STEL: 940 mg/m3, 200 ppm - Notes: FRANCE
OEL - TWA: 300 mg/m3, 62 ppm - STEL: 600 mg/m3, 124 ppm - Notes: GERMANY
OEL - TWA: 950 mg/m3 - STEL: 950 mg/m3 - Notes: HUNGARY
OEL - TWA: 200 mg/m3 - STEL: 950 mg/m3 - Notes: POLAND
OEL - TWA: 724 mg/m3, 150 ppm - STEL: 965 mg/m3, 200 ppm - Notes: SPAIN
OEL - TWA: 500 mg/m3, 100 ppm - STEL: 700 mg/m3, 150 ppm - Notes: SWEDEN
OEL - TWA: 724 mg/m3, 150 ppm - STEL: 966 mg/m3, 200 ppm - Notes: UK
ACGIH - TWA(8h): 50 ppm - STEL: 150 ppm - Notes: Eye and URT irr

m-tolylidene diisocyanate; toluene-diisocyanate - CAS: 26471-62-5

ACGIH - TWA: 0.036 mg/m3, 0.005 ppm - STEL: 0.14 mg/m3, 0.02 ppm - Notes: ITALY
OEL - TWA: 0.007 mg/m3 - STEL: 0.021 mg/m3 - Notes: POLAND
OEL - TWA: 0.014 mg/m3, 0.002 ppm - STEL: 0.04 mg/m3, 0.005 ppm - Notes: SWEDEN

DNEL Exposure Limit Values

n-butyl acetate - CAS: 123-86-4

Worker Industry: 960 mg/m3 - Exposure: Human Inhalation - Frequency: Short Term, systemic effects
Worker Industry: 960 mg/m3 - Exposure: Human Inhalation - Frequency: Short Term, local effects
Worker Industry: 480 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, systemic effects
Worker Industry: 480 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, local effects
Consumer: 3.4 mg/kg - Exposure: Human Oral - Frequency: Long Term, systemic effects
Consumer: 3.4 mg/kg - Exposure: Human Dermal - Frequency: Long Term, systemic effects
Consumer: 859.7 mg/m3 - Exposure: Human Inhalation - Frequency: Short Term, systemic effects
Consumer: 859.7 mg/m3 - Exposure: Human Inhalation - Frequency: Short Term, local effects
Consumer: 12 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, systemic effects
Consumer: 102.34 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, local effects

m-tolylidene diisocyanate; toluene-diisocyanate - CAS: 26471-62-5

Worker Industry: 0.14 mg/m3 - Exposure: Human Inhalation - Frequency: Short Term, systemic effects - Endpoint: Respiratory tract irritation
Worker Industry: 0.14 mg/m3 - Exposure: Human Inhalation - Frequency: Short Term, local effects - Endpoint: Respiratory tract irritation
Worker Industry: 0.035 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, systemic effects - Endpoint: Respiratory tract irritation
Worker Industry: 0.035 mg/m3 - Exposure: Human Inhalation - Frequency: Long Term, local effects - Endpoint: Respiratory tract irritation

PNEC Exposure Limit Values

n-butyl acetate - CAS: 123-86-4

Target: Marine water - Value: 0.018 mg/l
Target: Freshwater - Value: 0.18 mg/l
Target: Marine water sediments - Value: 0.0981 mg/kg
Target: Freshwater sediments - Value: 0.981 mg/kg
Target: Intermittent release - Value: 0.36 mg/l
Target: STP - Value: 35.6 mg/l
Target: Soil - Value: 0.0903 mg/kg

m-tolylidene diisocyanate; toluene-diisocyanate - CAS: 26471-62-5

Target: Marine water - Value: 0.00125 mg/l
Target: Freshwater - Value: 0.0125 mg/l
Target: Intermittent release - Value: 0.125 mg/l
Target: STP - Value: 1 mg/l
Target: Soil - Value: 1 mg/kg

8.2. Exposure controls

Eye protection:
Use safety goggles or close fitting safety goggles, don't use eye lens (Standard EN 166).

Skin protection:
Wear suitable protective clothing (Standard EN 1149).

Hand protection:
Use protective gloves that provides comprehensive protection, e.g. P.V.C., neoprene or rubber (Standard EN 374).

Respiratory protection:
Use adequate protective respiratory equipment, e.g. A2-P2 (Standard EN 405).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Properties	Value	Method:	Notes:
Appearance and colour:	Clear liquid	--	--
Odour:	Solvent-like	--	--
Odour threshold:	N.A.	--	Information not available
pH:	N.A.	--	Information not available
Melting point / freezing point:	N.A.	--	Information not available
Boiling point:	126 °C	--	--
Flash point:	27 °C	--	--
Evaporation rate:	N.A.	--	Information not available

Solid/gas flammability:	N.A.	--	Information not available
Upper/lower flammability or explosive limits:	N.A.	--	Information not available
Vapour pressure:	1.5 kPa @ 20°C	--	--
Vapour density:	N.A.	--	Information not available
Relative density:	1.08 g/cm3	--	--
Solubility in water:	Insoluble, REACTS WITH WATER	--	--
Solubility in oil:	N.A.	--	Information not available
Partition coefficient (n-octanol/water):	N.A.	--	Information not available
Auto-ignition temperature:	N.A.	--	Information not available
Decomposition temperature:	N.A.	--	Information not available
Viscosity:	N.A.	--	Information not available
Explosive properties:	N.A.	--	Information not available
Oxidizing properties:	N.A.	--	Information not available

Boiling point, Flash point and Upper/lower flammability or explosive limits, Evaporation rate, Vapour pressure, Auto-ignition temperature: if not differently specified, it is to be referred to the solvent.

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

9.2. Other information

Properties	Value	Method:	Notes:
Miscibility:	N.A.	--	Information not available
Fat Solubility:	N.A.	--	Information not available
Conductivity:	N.A.	--	Information not available
Substance Groups relevant properties	N.A.	--	Information not available

SECTION 10: Stability and reactivity

10.1. Reactivity
Stable under normal conditions of storage and manipulation.

10.2. Chemical stability
Stable under normal conditions of storage and manipulation.

10.3. Possibility of hazardous reactions
Exothermic reaction with amines and alcohols; reacts with water forming CO2: in closed containers, risk of bursting owing to increase of pressure.
It may generate flammable gases on contact with elementary metals (alkalis and alkaline earth, alloys in powder or vapours) and powerful reducing agents.

It may generate toxic gases on contact with oxidising mineral acids, and powerful oxidising agents.

10.4. Conditions to avoid

Stable under normal conditions.

10.5. Incompatible materials

This information is not available.

10.6. Hazardous decomposition products

No hazardous decomposition products when stored and handled correctly.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological information of the product:
N.A.
Toxicological information of the main substances found in the product:
n-butyl acetate - CAS: 123-86-4
a) acute toxicity:
Test: LD50 - Route: Oral - Species: Rat > 10000 mg/kg
Test: LD50 - Route: Skin - Species: Rabbit > 5000 mg/kg
Test: LC50 - Route: Inhalation - Species: Rat > 21 mg/l - Duration: 4h
b) skin corrosion/irritation:
Test: Skin Irritant - Route: Skin - Species: Rabbit Negative - Source: OECD 404
c) serious eye damage/irritation:
Test: Eye Irritant - Route: Eyes - Species: Rabbit Negative - Source: OECD 405
d) respiratory or skin sensitisation:
Test: Skin Sensitization - Route: Skin - Species: Guinea pig Negative - Source: OECD 406
e) germ cell mutagenicity:
Test: Mutagenesis - Route: In vitro - Species: Salmonella Typhimurium Negative - Source: OECD 471
Test: Mutagenesis - Route: In vitro - Species: Mammalian cells Negative - Source: OECD 473
h) STOT-single exposure:
Test: NOAEC - Route: Inhalation - Species: Rat Negative 2410 mg/m3 - Duration: 6h - Source: OECD 414 - Notes: Target: Central nervous system
Toxicological kinetics, metabolism and distribution information:
Test: NOAEC - Route: Inhalation - Species: Rat 500 ppm - Duration: 90 days
m-tolylidene diisocyanate; toluene-diisocyanate - CAS: 26471-62-5
a) acute toxicity:
Test: LD50 - Route: Oral - Species: Rat, male 5110 mg/kg - Source: OECD 401
Test: LD50 - Route: Oral - Species: Rat, female 4130 mg/kg - Source: OECD 401
Test: LD50 - Route: Skin - Species: Rabbit > 9400 mg/kg - Source: OECD 402
Test: LC50 - Route: Inhalation Vapour - Species: Rat 0.47 mg/l - Duration: 1h - Source: OECD 403
Test: LC50 - Route: Inhalation Vapour - Species: Rat 0.107 mg/l - Duration: 4h - Source: OECD 403
b) skin corrosion/irritation:
Test: Skin Irritant - Route: Skin - Species: Rabbit Positive - Duration: 4h - Source: OECD 404
f) carcinogenicity:
Test: Carcinogenicity - Route: Inhalation Vapour - Species: Rat 0.15 ppm - Duration: 2 years - Source: OECD 453

Test: Carcinogenicity - Route: Inhalation Vapour - Species: Mouse 0.15 ppm - Duration: 2 years - Source: OECD 453

i) STOT-repeated exposure:

Test: LOAEC - Route: Inhalation - Species: Rat Positive 0.362 mg/m3 - Duration: 113 weeks - Source: OECD 453 - Notes: Target: respiratory tract

Toxicological kinetics, metabolism and distribution information:

Test: LOAEL - Route: Inhalation Vapour - Species: Rat 0.05 ppm - Duration: 2 years - Source: OECD 453

Test: NOAEL - Route: Oral - Species: Animal, male 30 mg/kg - Duration: 90 days

Test: NOAEL - Route: Oral - Species: Animal, female 60 mg/kg - Duration: 90 days

If not differently specified, the information required in Regulation (EU)2015/830 listed below must be considered as N.A.:

a) acute toxicity;
b) skin corrosion/irritation;
c) serious eye damage/irritation;
d) respiratory or skin sensitisation;
e) germ cell mutagenicity;
f) carcinogenicity;
g) reproductive toxicity;
h) STOT-single exposure;
i) STOT-repeated exposure;
j) aspiration hazard.

SECTION 12: Ecological information

12.1. Toxicity

Adopt sound working practices, so that the product is not released into the environment.

n-butyl acetate - CAS: 123-86-4

a) Aquatic acute toxicity:

Endpoint: LC50 - Species: Fish 18 mg/l - Duration h: 96 - Notes: Method OECD 203

Endpoint: EC50 - Species: Daphnia 44 mg/l - Duration h: 48

Endpoint: EC50 - Species: Algae 648 mg/l - Duration h: 72

Endpoint: NOEC - Species: Algae 200 mg/l - Duration h: 72

b) Aquatic chronic toxicity:

Endpoint: NOEC - Species: Daphnia 23 mg/l - Duration h: 504 - Notes: Method OECD 211

c) Bacteria toxicity:

Endpoint: EC50 - Species: Activated sludge 356 mg/l - Duration h: 40

e) Plant toxicity:

Endpoint: EC50 - Species: Lactuca sativa > 1000 mg/kg - Duration h: 504 - Notes: Method OECD 208

m-tolylidene diisocyanate; toluene-diisocyanate - CAS: 26471-62-5

a) Aquatic acute toxicity:

Endpoint: LC50 - Species: Fish 133 mg/l - Duration h: 96 - Notes: Method OECD 203

Endpoint: EC50 - Species: Daphnia 12.5 mg/l - Duration h: 48 - Notes: Method OECD 202

Endpoint: EC50 - Species: Algae 3230 mg/l - Duration h: 96 - Notes: Method OECD 201

b) Aquatic chronic toxicity:

Endpoint: NOEC - Species: Daphnia 1.1 mg/l - Duration h: 504 - Notes: Method OECD 211

c) Bacteria toxicity:

Endpoint: EC50 - Species: Activated sludge 100 mg/l - Duration h: 3 - Notes: Method OECD 209

d) Terrestrial toxicity:

Endpoint: LC50 - Species: Earthworm > 1000 mg/kg - Duration h: 336 - Notes: Method OECD 207

e) Plant toxicity:

Endpoint: EC50 - Species: Avena sativa > 1000 mg/kg - Duration h: 336 - Notes: Method OECD 208

12.2. Persistence and degradability

n-butyl acetate - CAS: 123-86-4

Biodegradability: Readily biodegradable - Test: Biochemical oxigen demand - Duration: 28 days - %: 83 - Notes: Method OECD 301D

m-tolylidene diisocyanate; toluene-diisocyanate - CAS: 26471-62-5

Biodegradability: Non-readily biodegradable - Test: Biochemical oxigen demand - Duration: 28 days - %: 0 - Notes: Method OECD 302C

12.3. Bioaccumulative potential

n-butyl acetate - CAS: 123-86-4

Bioaccumulation: Not much bioaccumulative - Test: BCF - Bioconcentrantion factor 15.3 Test: LogKow 2.3

m-tolylidene diisocyanate; toluene-diisocyanate - CAS: 26471-62-5

Bioaccumulation: Not bioaccumulative - Test: LogKow 3.43

12.4. Mobility in soil

n-butyl acetate - CAS: 123-86-4

Mobility in soil: Mobile - Test: LogKoc 1.268-1.844

12.5. Results of PBT and vPvB assessment

vPvB Substances: None - PBT Substances: None

12.6. Other adverse effects

Information not available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Recover, if possible. Send to authorised disposal plants or for incineration under controlled conditions. In so doing, comply with the local and national regulations currently in force.

SECTION 14: Transport information

14.1. UN number

ADR-UN number:	UN 1866
IATA-Un number:	UN 1866
IMDG-Un number:	UN 1866

14.2. UN proper shipping name

ADR-Shipping Name:	Resin solution

14.3. Transport hazard class(es)

ADR-Class:	3
IATA-Class:	3
IMDG-Class:	3

14.4. Packing group

ADR-Packing Group:	III
IATA-Packing group:	III
IMDG-Packing group:	III

14.5. Environmental hazards

14.6. Special precautions for user

IMDG-EMS: F-E,S-E

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

N.R.

SECTION 15: Regulatory information

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

Dir. 98/24/EC (Risks related to chemical agents at work)
Dir. 2000/39/EC (Occupational exposure limit values)
Regulation (EC) n. 1907/2006 (REACH)
Regulation (EC) n. 1272/2008 (CLP)
Regulation (EC) n. 790/2009 (ATP 1 CLP)
Regulation (EU) 2015/830
Regulation (EU) n. 286/2011 (ATP 2 CLP)
Regulation (EU) n. 618/2012 (ATP 3 CLP)
Regulation (EU) n. 487/2013 (ATP 4 CLP)
Regulation (EU) n. 944/2013 (ATP 5 CLP)
Regulation (EU) n. 605/2014 (ATP 6 CLP)
Regulation (EU) n. 2015/1221 (ATP 7 CLP)
Regulation (EU) n. 2016/918 (ATP 8 CLP)
Regulation (EU) n. 2016/1179 (ATP 9 CLP)
Regulation (EU) n. 2017/776 (ATP 10 CLP)

Restrictions related to the product or the substances contained according to Annex XVII Regulation (EC) 1907/2006 (REACH) and subsequent modifications:

Restrictions related to the product:

Restriction 3
Restriction 40

Restrictions related to the substances contained:

No restriction.

Where applicable, refer to the following regulatory provisions:
Directive 2012/18/EU (Seveso III)
Regulation (EC) nr.648/2004 (detergents).
Dir. 2004/42/EC (VOC directive)
WGK Classification (Water hazard class - Verwaltungsvorschrift wassergefährdende Stoffe)

Provisions related to directive EU 2012/18 (Seveso III):

Seveso III category according to Annex 1, part 1

Product belongs to category: P5c

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for the mixture.

Substances for which a Chemical Safety Assessment has been carried out:

n-butyl acetate
m-tolylidene diisocyanate; toluene-diisocyanate

SECTION 16: Other information

Text of phrases referred to under heading 3:

H319 Causes serious eye irritation.
H317 May cause an allergic skin reaction.
H226 Flammable liquid and vapour.
H336 May cause drowsiness or dizziness.
EUH066 Repeated exposure may cause skin dryness or cracking.
H330 Fatal if inhaled.
H315 Causes skin irritation.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H351 Suspected of causing cancer.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.

Hazard class and hazard category	Code	Description
Flam. Liq. 3	2.6/3	Flammable liquid, Category 3
Acute Tox. 1	3.1/1/Inhal	Acute toxicity (inhalation), Category 1
Skin Irrit. 2	3.2/2	Skin irritation, Category 2
Eye Irrit. 2	3.3/2	Eye irritation, Category 2
Resp. Sens. 1	3.4.1/1	Respiratory Sensitisation, Category 1
Skin Sens. 1	3.4.2/1	Skin Sensitisation, Category 1
Skin Sens. 1,1A,1B	3.4.2/1-1A-1B	Skin Sensitisation, Category 1,1A,1B
Carc. 2	3.6/2	Carcinogenicity, Category 2
STOT SE 3	3.8/3	Specific target organ toxicity - single exposure, Category 3
Aquatic Chronic 3	4.1/C3	Chronic (long term) aquatic hazard, category 3

This safety data sheet has been completely updated in compliance to Regulation 2015/830.
This document was prepared by a competent person who has received appropriate training.
Main bibliographic sources:
NIOSH - Registry of toxic effects of chemical substances (1983)
I.N.R.S. - Fiche Toxicologique

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality. 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.
It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.
This MSDS cancels and replaces any preceding release.

ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road.
ATE:	Acute Toxicity Estimate
ATEmix:	Acute toxicity Estimate (Mixtures)
CAS:	Chemical Abstracts Service (division of the American Chemical Society).
CLP:	Classification, Labeling, Packaging.
DNEL:	Derived No Effect Level.
EINECS:	European Inventory of Existing Commercial Chemical Substances.
GefStoffVO:	Ordinance on Hazardous Substances, Germany.
GHS:	Globally Harmonized System of Classification and Labeling of Chemicals.

IATA:	International Air Transport Association.
IATA-DGR:	Dangerous Goods Regulation by the "International Air Transport Association" (IATA).
ICAO:	International Civil Aviation Organization.
ICAO-TI:	Technical Instructions by the "International Civil Aviation Organization" (ICAO).
IMDG:	International Maritime Code for Dangerous Goods.
INCI:	International Nomenclature of Cosmetic Ingredients.
KSt:	Explosion coefficient.
LC50:	Lethal concentration, for 50 percent of test population.
LD50:	Lethal dose, for 50 percent of test population.
PNEC:	Predicted No Effect Concentration.
RID:	Regulation Concerning the International Transport of Dangerous Goods by Rail.
STEL:	Short Term Exposure limit.
STOT:	Specific Target Organ Toxicity.
TLV:	Threshold Limiting Value.
TWA:	Time-weighted average
WGK:	German Water Hazard Class.

Exposure Scenario
n-butyl acetate

Version:2 Revision date: 25/02/2019

Exposure scenario	Sector(s) of Use:	Process Category(ies):	Environmental Release Category(ies):
1. Formulation & (re)packing of substances and mixtures - Industrial	SU 3, SU 10	PROC1, PROC2, PROC 3, PROC4, PROC 5, PROC8a, PROC 8b, PROC9, PROC14, PROC15	ERC1
2. Uses in coating – Industrial	SU 3	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15	ERC4
3. Uses in coating – Professional	SU22	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19	ERC8a
4. Use in laboratories – Industrial	SU3	PROC10, PROC15	ERC4
5. Use in laboratories – Professional	SU22	PROC10, PROC15	ERC8a

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Exposure Scenario
n-butyl acetate

Section 1 - Exposure Scenario Title

Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.

ES1. Formulation & (re)packing of substances and mixtures - Industrial

Description of activities/processes treated in the exposure scenario

Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tabletting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

Main User Group:
SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
SU10 - Formulation

Process category
PROC 1 Use in closed process, no likelihood of exposure
PROC 2 Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC 3 Use in closed batch process (synthesis or formulation)
PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC 5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC 8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC 9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC14 Tabletting, compression, extrusion, pelletisation, granulation
PROC 15 Use as a laboratory reagent

Environmental release category:
ERC1 - Manufacture of the substance

Assessment method:
Health: Used ECETOC TRA model.
Environment: Used ECETOC TRA model. Release factors refined to produce RCRs less than 1.

Section 2 - Operating Conditions and Risk management measures

2.1 - Operating Conditions related to human exposure

Duration of exposure	Covers daily exposures up to 8 hours (unless stated differently)
Frequency of exposure	300 d/year
Physical form	Liquid
Vapour pressure	0,5-10 kPa at STP

Concentration of substance in preparation or article: Covers percentage substance in the product up to 100 % (unless stated differently)

Temperature: Assumes activities are at ambient temperature (unless stated differently)

2.2 - Risk management measures related to human health

Organisational and Technical measures; Risk management measures (general):
If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes. Formulate in enclosed or ventilated mixing vessels. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

Organisational and Technical measures; Risk management measures (specific - Contributing Scenario CS):
CS 1) General exposure. Continuous process
Handle substance within a closed system.
CS 2) General exposures. Continuous process. With sample collection:

Use suitable eye protection and gloves.
CS 3) General exposures. Use in contained batch process.
Handle substance within a closed system. Use suitable eye protection and gloves.
CS 4) Process sampling. Batch process. With sample collection:
Use suitable eye protection and gloves.
CS 5) Bulk transfers. Non-dedicated facility:
Use drum pumps or carefully pour from container. Clear spills immediately. Use suitable eye protection and gloves.
CS 6) Bulk transfers. Dedicated facility:
Clear transfer lines prior to de-coupling. Clear spills immediately. Use suitable eye protection and gloves. Retain drain downs in sealed storage pending disposal or for subsequent recycle.
CS 7) Laboratory activities:
Use suitable eye protection and gloves.
CS 8) Drum/batch transfers. Filling / preparation of equipment from drums or containers. Bulk weighing. Dedicated facility. Equipment cleaning and maintenance
Use suitable eye protection and gloves.
CS 9) Production or preparation or articles by tabletting, compression, extrusion or pelletisation. Batch process
Use suitable eye protection and gloves.
CS 10) Mixing operations (open systems). Mixing operations (closed systems). Batch process
Use suitable eye protection and gloves.

2.3 - Operating Conditions related to environment

Indoor/Outdoor use

Product Characteristics: Substance is a unique structure. Liquid, vapour pressure 0.5 - 10 kPa at STP. Soluble in water (1-10g/l). Harmful to aquatic species. Readily biodegradable. Low bioaccumulation potential.

Emission days per site	300 – Continuous release and batch operation
Amount used per site	4.000 ton/year (13.333 kg/day)
Abatement measures waste water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Provide onsite wastewater removal efficiency of ≥ 89,1%.

Environmental factors not influenced by risk management

Local freshwater dilution factor:	9
Local marine water dilution factor:	90

Initial release prior to Risk management measures

Release fraction to air from process	0,025
Release fraction to wastewater from process	0,0002
Release fraction to soil from process	0,0001

2.4 - Risk management measures related to environment

Technical measures:
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation.

Organisational measures:
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements 89,1%.

Conditions and measures related to municipal sewage treatment plant:
Estimated substance removal from wastewater via domestic sewage treatment (%): 87.
Assumed domestic sewage treatment plant flow (m^3/d): 2000.

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

Estimated amount entering waste treatment no greater than:	5%.
Type of treatment suitable for waste:	approved landfill; incineration
Removal efficiency (%):	99,98.

Treat as hazardous waste. Dispose of waste product or used containers according to local regulations

Conditions and measures related to external recovery of waste
Not applicable

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

Workers

	Inhalation (vapour)[1]		Dermal [2]
CONTRIBUTING SCENARIO	**Exposure (ppm)**	**RCR**	**Exposure (mg/kg/day)**
CS1 (8h)	0,01	0	0,34
CS2 (8h)	10	0,1	1,37
CS3 (8h)	25	0,25	0,34
CS4 (8h)	20	0,2	6,86
CS5 (8h)	50	0,5	13,71
CS6 (8h)	50	0,5	6,86
CS7 (8h)	10	0,1	0,34
CS8 (8h)	50	0,5	6,86
CS9 (8h)	50	0,5	13,71
CS10 (8h)	50	0,5	13,71

[1]Available hazard data do not support the need for a DNEL to be established for other health effects
[2]It is not possible to derive a DNEL for this end point

Environment

Compartment	**Predicted environmental concentration**	**RCR**
Microorganisms in STP	0,145 mg/l	0,004
Surface water	0,015 mg/l	0,083
Fresh water sediment	0,301 mg/kg dw	0,307
Sea water during emission episode	0,002 mg/l	0,083
Marine sediment	0,03 mg/kg dw	0,306
Soil	0,065 mg/kg dw	0,724

Section 4 - Guidance to Downstream User

Health

Inhalation (vapour): No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).

Dermal: No corrections required as all exposures are assumed to be substance concentrations of up to 100%.

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

$$\frac{m_{spERC} \times \left(1 - E_{ER,spERC}\right) \times F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} \times \left(1 - E_{ER,site}\right) \times F_{release,site}}{DF_{site}}$$

where: m_{spERC}: Substance use rate in spERC;
$E_{ER,spERC}$: Efficacy of RMM in spERC;
$F_{release,spERC}$: Initial release fraction in spERC;
DF_{spERC}: dilution factor of STP effluent in river;
m_{site}: Susbstance use rate at site;
$E_{ER,site}$: Efficacy of RMM at site;
$F_{release,site}$: Initial release fraction at site;
DF_{site}: dilution factor of STP effluent in river.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Section 1 - Exposure Scenario Title
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.
ES2. Uses in coating – Industrial
Description of activities/processes treated in the exposure scenario
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.
Main User Group: **SU3** - Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category **PROC 1** Use in closed process, no likelihood of exposure **PROC 2** Use in closed, continuous process with occasional controlled exposure (e.g. sampling) **PROC 3** Use in closed batch process (synthesis or formulation) **PROC 4** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC 5** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **PROC 7** Industrial spraying **PROC8a** Transfer of substance or mixture (charging and discharging) at non-dedicated facilities **PROC 8b** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities **PROC 10** Roller application or brushing **PROC 13** Treatment of articles by dipping and pouring **PROC 15** Use as a laboratory reagent
Environmental release category: **ERC1** - Manufacture of the substance
Assessment method: Health: Used ECETOC TRA model. Environment: Used ECETOC TRA model.
Section 2 - Operating Conditions and Risk management measures
2.1 - Operating Conditions related to human exposure

Duration of exposure	Covers daily exposures up to 8 hours (unless stated differently)
Frequency of exposure	300 d/year
Physical form	Liquid
Vapour pressure	0,5-10 kPa at STP

Concentration of substance in preparation or article: Covers percentage substance in the product up to 100 % (unless stated differently)
Temperature: Assumes activities are at ambient temperature (unless stated differently)
2.2 - Risk management measures related to human health
Organisational and Technical measures; Risk management measures (general): If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes. Formulate in enclosed or ventilated mixing vessels. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Organisational and Technical measures; Risk management measures (specific - Contributing Scenario CS): **CS 1) General exposure. Continuous process** Handle substance within a closed system.

CS 2) General exposures. Continuous process. With sample collection:
Use suitable eye protection and gloves.
CS 3) General exposures. Use in contained batch process.
Handle substance within a closed system. Use suitable eye protection and gloves.
CS 4) Process sampling. Batch process. With sample collection:
Use suitable eye protection and gloves.
CS 5) Bulk transfers. Non-dedicated facility:
Use drum pumps or carefully pour from container. Clear spills immediately. Use suitable eye protection and gloves.
CS 6) Bulk transfers. Dedicated facility:
Clear transfer lines prior to de-coupling. Clear spills immediately. Use suitable eye protection and gloves. Retain drain downs in sealed storage pending disposal or for subsequent recycle.
CS 7) Laboratory activities:
Use suitable eye protection and gloves.
CS 8) Mixing operations (open systems). Mixing operations (closed systems). Batch process
Use suitable eye protection and gloves.
CS 9) Treatment by dipping and pouring. Indoor. Manual. Machine
Use suitable eye protection and gloves.
CS 10) Roller, spreader, flow application. Indoor. Cleaning
Use suitable eye protection and gloves.
CS 11) Spraying/fogging by manual application. Spraying/fogging by machine application. With potential for aerosol generation
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Use suitable eye protection and gloves.

2.3 - Operating Conditions related to environment

Indoor/Outdoor use

Product Characteristics: Substance is a unique structure. Liquid, vapour pressure 0.5 - 10 kPa at STP. Soluble in water (1-10g/l). Harmful to aquatic species. Readily biodegradable. Low bioaccumulation potential.

Emission days per site	300 – Continuous release and batch operation
Amount used per site	5.000 ton/year (16.666 kg/day)
Abatement measures waste water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Provide onsite wastewater removal efficiency of ≥ 89,1%.

Environmental factors not influenced by risk management

Local freshwater dilution factor:	9
Local marine water dilution factor:	90

Initial release prior to Risk management measures

Release fraction to air from process	0,098
Release fraction to wastewater from process	0,02
Release fraction to soil from process	0

2.4 - Risk management measures related to environment

Technical measures:
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Use a wet scrubber or dry filtration system to control air emissions of aerosols. Treat air emission to provide a typical removal efficiency of (%) 90. Provide onsite wastewater removal efficiency of ≥ (%) 89.1.

Organisational measures:
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements 89,1%.

Conditions and measures related to municipal sewage treatment plant:
Estimated substance removal from wastewater via domestic sewage treatment (%): 87.
Assumed domestic sewage treatment plant flow (m^3/d): 2000.

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

Estimated amount entering waste treatment no greater than: 5%.

Type of treatment suitable for waste: approved landfill; incineration

Removal efficiency (%): 99,98.

Treat as hazardous waste. Dispose of waste product or used containers according to local regulations

Conditions and measures related to external recovery of waste

Not applicable

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

Workers

	Inhalation (vapour)[1]		Dermal [2]
CONTRIBUTING SCENARIO	**Exposure (ppm)**	**RCR**	**Exposure (mg/kg/day)**
CS1 (8h)	0,01	0	0,34
CS2 (8h)	10	0,1	1,37
CS3 (8h)	25	0,25	0,34
CS4 (8h)	20	0,2	6,86
CS5 (8h)	50	0,5	13,71
CS6 (8h)	50	0,5	6,86
CS7 (8h)	10	0,1	0,34
CS8 (8h)	50	0,5	13,71
CS9 (8h)	50	0,5	13,71
CS10 (8h)	50	0,5	27,43
CS11 (8h)	12,5	0,125	42,86

[1]Available hazard data do not support the need for a DNEL to be established for other health effects

[2]It is not possible to derive a DNEL for this end point

Environment

Compartment	**Predicted environmental concentration**	**RCR**
Microorganisms in STP	0,181 mg/l	0,005
Surface water	0,019 mg/l	0,103
Fresh water sediment	0,374 mg/kg dw	0,381
Sea water during emission episode	0,002 mg/l	0,103
Marine sediment	0,037 mg/kg dw	0,379
Soil	0,073 mg/kg dw	0,811

Section 4 - Guidance to Downstream User

Health

Inhalation (vapour): No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).

Dermal: No corrections required as all exposures are assumed to be substance concentrations of up to 100%.

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

$$\frac{m_{spERC} \times \left(1 - E_{ER,spERC}\right) \times F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} \times \left(1 - E_{ER,site}\right) \times F_{release,site}}{DF_{site}}$$

where: m_{spERC}: Substance use rate in spERC;
$E_{ER,spERC}$: Efficacy of RMM in spERC;
$F_{release,spERC}$: Initial release fraction in spERC;
DF_{spERC}: dilution factor of STP effluent in river;
m_{site}: Susbstance use rate at site;
$E_{ER,site}$: Efficacy of RMM at site;
$F_{release,site}$: Initial release fraction at site;
DF_{site}: dilution factor of STP effluent in river.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Section 1 - Exposure Scenario Title

Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.

ES3. Uses in coating – Professional

Description of activities/processes treated in the exposure scenario

Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.

Main User Group:
SU22 - Professional uses

Process category
PROC 1 Use in closed process, no likelihood of exposure
PROC 2 Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC 3 Use in closed batch process (synthesis or formulation)
PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC 5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC 8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC 10 Roller application or brushing
PROC 11 Non industrial spraying
PROC 13 Treatment of articles by dipping and pouring
PROC 15 Use as a laboratory reagent

Environmental release category:
ERC8a - Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)

Assessment method:
Health: Used ECETOC TRA model.
Environment: Used ECETOC TRA model.

Section 2 - Operating Conditions and Risk management measures

2.1 - Operating Conditions related to human exposure

Duration of exposure	Covers daily exposures up to 8 hours (unless stated differently)
Frequency of exposure	300 d/year
Physical form	Liquid
Vapour pressure	0,5-10 kPa at STP

Concentration of substance in preparation or article: Covers percentage substance in the product up to 100 % (unless stated differently)

Temperature: Assumes activities are at ambient temperature (unless stated differently)

2.2 - Risk management measures related to human health

Organisational and Technical measures; Risk management measures (general):
If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes. Formulate in enclosed or ventilated mixing vessels. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

Organisational and Technical measures; Risk management measures (specific - Contributing Scenario CS):
CS 1) General exposure. Continuous process
Handle substance within a closed system.

CS 2) General exposures. Continuous process. With sample collection:
Use suitable eye protection and gloves.
CS 3) General exposures. Use in contained batch process.
Handle substance within a closed system. Use suitable eye protection and gloves.
CS 4) Process sampling. Batch process. With sample collection:
Use suitable eye protection and gloves.
CS 5) Bulk transfers. Non-dedicated facility:
Limit the substance content in the product to 25 %. Use drum pumps or carefully pour from container. Clear spills immediately. Use suitable eye protection and gloves.
CS 6) Bulk transfers. Dedicated facility:
Clear transfer lines prior to de-coupling. Clear spills immediately. Use suitable eye protection and gloves. Retain drain downs in sealed storage pending disposal or for subsequent recycle
CS 7) Laboratory activities:
Use suitable eye protection and gloves.
CS 8) Mixing operations (open systems). Batch process
Limit the substance content in the product to 25 %. Use suitable eye protection and gloves.
CS 9) Treatment by dipping and pouring. Indoor. Manual. Machine
Limit the substance content in the product to 25 %. Use suitable eye protection and gloves
CS 10) Roller, spreader, flow application. Indoor. Cleaning
Limit the substance content in the product to 25 %. Use suitable eye protection and gloves
CS 11) Spraying/fogging by manual application. Spraying/fogging by machine application. With potential for aerosol generation
Wear a respirator conforming to EN140 with Type A filter or better. Use suitable eye protection and gloves.
CS 12) Transfer from/pouring from containers. Mixing operations (open systems). Manual. Indoor.
Limit the substance content in the product to 25 %. Use suitable eye protection and gloves

2.3 - Operating Conditions related to environment

Indoor/Outdoor use

Product Characteristics: Substance is a unique structure. Liquid, vapour pressure 0.5 - 10 kPa at STP. Soluble in water (1-10g/l). Harmful to aquatic species. Readily biodegradable. Low bioaccumulation potential.

Emission days per site	365 – Continuous release and batch operation
Amount used per site	200 ton/year (550 kg/day)
Abatement measures waste water	If discharging to domestic sewage treatment plant, no onsite wastewater treatment required. Provide onsite wastewater removal efficiency of ≥ 89,1%.

Environmental factors not influenced by risk management

Local freshwater dilution factor:	9
Local marine water dilution factor:	90

Initial release prior to Risk management measures

Release fraction to air from process	0,098
Release fraction to wastewater from process	0,01
Release fraction to soil from process	0,01

2.4 - Risk management measures related to environment

Technical measures:
All waste water emissions should be discharged to domestic sewage treatment or collected and sent for waste disposal. Use a wet scrubber or dry filtration system to control air emissions of aerosols

Organisational measures:
Prevent environmental discharge consistent with regulatory requirements

Conditions and measures related to municipal sewage treatment plant:
Estimated substance removal from wastewater via domestic sewage treatment (%): 89,1.
Assumed domestic sewage treatment plant flow (m^3/d): 2000.

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

Estimated amount entering waste treatment no greater than: 2%.

Type of treatment suitable for waste: approved landfill; incineration

Removal efficiency (%): 99,98.

Treat as hazardous waste. Dispose of waste product or used containers according to local regulations. Dispose of waste water from wet scrubbers using a waste disposal contractor only.

Conditions and measures related to external recovery of waste

Not applicable

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

Workers

	Inhalation (vapour)[1]		Dermal [2]
CONTRIBUTING SCENARIO	**Exposure (ppm)**	**RCR**	**Exposure (mg/kg/day)**
CS1 (8h)	0,01	0	0,34
CS2 (8h)	20	0,2	1,37
CS3 (8h)	25	0,25	0,34
CS4 (8h)	50	0,5	6,86
CS5 (8h)	60	0,6	13,71
CS6 (8h)	50	0,5	6,86
CS7 (8h)	10	0,1	0,34
CS8 (8h)	60	0,6	13,71
CS9 (8h)	60	0,6	13,71
CS10 (8h)	60	0,6	27,43
CS11 (8h)	50	0,5	107,14
CS12 (8h)	60	0,6	141,43

[1]Available hazard data do not support the need for a DNEL to be established for other health effects

[2]It is not possible to derive a DNEL for this end point

Environment

Compartment	**Predicted environmental concentration**	**RCR**
Microorganisms in STP	0,0003 mg/l	<0,0001
Surface water	0,000537 mg/l	0,003
Fresh water sediment	0,011 mg/kg dw	0,011
Sea water during emission episode	0,0000468 mg/l	0,003
Marine sediment	0,000938 mg/kg dw	0,011
Soil	0,000146 mg/kg dw	0,002

Section 4 - Guidance to Downstream User

Health

Inhalation (vapour): No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).

Dermal:	To scale from a concentration of 5-25% to 100%, multiply by 1,7

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

$$\frac{m_{spERC} \times \left(1 - E_{ER,spERC}\right) \times F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} \times \left(1 - E_{ER,site}\right) \times F_{release,site}}{DF_{site}}$$

where: m_{spERC}: Substance use rate in spERC;
$E_{ER,spERC}$: Efficacy of RMM in spERC;
$F_{release,spERC}$: Initial release fraction in spERC;
DF_{spERC}: dilution factor of STP effluent in river;
m_{site}: Susbstance use rate at site;
$E_{ER,site}$: Efficacy of RMM at site;
$F_{release,site}$: Initial release fraction at site;
DF_{site}: dilution factor of STP effluent in river.

Not applicable for wide dispersive uses.

Exposure Scenario
n-butyl acetate

Section 1 - Exposure Scenario Title	
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.	
ES4. Use in laboratories – Industrial	
Description of activities/processes treated in the exposure scenario	
Use of the substance within laboratory settings, including material transfers and equipment cleaning	
Main User Group: **SU3** - Industrial uses	
Process category **PROC 10** Roller application or brushing **PROC 15** Use as a laboratory reagent	
Environmental release category: **ERC4** - Use of non-reactive processing aid at industrial site (no inclusion into or onto article)	
Assessment method: Health: Used ECETOC TRA model. Environment: Used ECETOC TRA model.	
Section 2 - Operating Conditions and Risk management measures	
2.1 - Operating Conditions related to human exposure	
Duration of exposure	Covers daily exposures up to 8 hours (unless stated differently)
Frequency of exposure	20 d/year
Physical form	Liquid
Vapour pressure	0,5-10 kPa at STP
Concentration of substance in preparation or article: Covers percentage substance in the product up to 100 % (unless stated differently)	
Temperature: Assumes activities are at ambient temperature (unless stated differently)	
2.2 - Risk management measures related to human health	
Organisational and Technical measures; Risk management measures (general): If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes. Formulate in enclosed or ventilated mixing vessels. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.	
Organisational and Technical measures; Risk management measures (specific - Contributing Scenario CS): **CS 1) Laboratory activities General exposures. Industrial.** Use suitable eye protection and gloves. **CS 2) Laboratory activities Roller, spreader, flow application. Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing. Industrial** Use suitable eye protection and gloves.	
2.3 - Operating Conditions related to environment	
Indoor/Outdoor use	
Product Characteristics: Substance is a unique structure. Liquid, vapour pressure 0.5 - 10 kPa at STP. Soluble in water (1-10g/l). Harmful to aquatic species. Readily biodegradable. Low bioaccumulation potential.	
Emission days per site	20 – Continuous release and batch operation
Amount used per site	1 ton/year (50 kg/day)
Environmental factors not influenced by risk management Local freshwater dilution factor: 9 Local marine water dilution factor: 90	
Initial release prior to Risk management measures	

Release fraction to air from process	0,025
Release fraction to wastewater from process	0,02
Release fraction to soil from process	0,0001

2.4 - Risk management measures related to environment

Technical measures:
None

Organisational measures:
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements

Conditions and measures related to municipal sewage treatment plant:
Estimated substance removal from wastewater via domestic sewage treatment (%): 89,1.
Assumed domestic sewage treatment plant flow (m^3/d): 2000.

Conditions and measures related to external treatment of waste for disposal.
Estimated amount entering waste treatment no greater than: 95%.
Type of treatment suitable for waste: incineration
Removal efficiency (%): 99,98.
Treat as hazardous waste. Dispose of waste product or used containers according to local regulations. Dispose of waste water from wet scrubbers using a waste disposal contractor only.

Conditions and measures related to external recovery of waste
Not applicable

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

Workers

	Inhalation (vapour)[1]		Dermal [2]
CONTRIBUTING SCENARIO	**Exposure (ppm)**	**RCR**	**Exposure (mg/kg/day)**
CS1 (8h)	10	0,1	0,34
CS2 (8h)	50	0,5	27,43

[1]Available hazard data do not support the need for a DNEL to be established for other health effects
[2]It is not possible to derive a DNEL for this end point

Environment

Compartment	Predicted environmental concentration	RCR
Microorganisms in STP	0,0003 mg/l	<0,0001
Surface water	0,000537 mg/l	0,003
Fresh water sediment	0,011 mg/kg dw	0,011
Sea water during emission episode	0,0000468 mg/l	0,003
Marine sediment	0,0123 mg/kg dw	0,121
Soil	0,02 mg/kg dw	0,225

Section 4 - Guidance to Downstream User

Health

Inhalation (vapour): No corrections required as all exposures are assumed to be for 8 hours (worse case assessment). Dermal: To scale from a concentration of 5-25% to 100%, multiply by 1,7
Environment Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. $$\frac{m_{spERC} \times (1 - E_{ER,spERC}) \times F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} \times (1 - E_{ER,site}) \times F_{release,site}}{DF_{site}}$$ where: m_{spERC}: Substance use rate in spERC; $E_{ER,spERC}$: Efficacy of RMM in spERC; $F_{release,spERC}$: Initial release fraction in spERC; DF_{spERC}: dilution factor of STP effluent in river; m_{site}: Susbstance use rate at site; $E_{ER,site}$: Efficacy of RMM at site; $F_{release,site}$: Initial release fraction at site; DF_{site}: dilution factor of STP effluent in river. If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required. Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

Exposure Scenario
n-butyl acetate

Section 1 - Exposure Scenario Title	
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.	
ES5. Use in laboratories – Professional	
Description of activities/processes treated in the exposure scenario	
Use of small quantities within laboratory settings, including material transfers and equipment cleaning	
Main User Group: **SU22** - Professional uses	
Process category **PROC 10** Roller application or brushing **PROC 15** Use as a laboratory reagent	
Environmental release category: **ERC8a** - Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)	
Assessment method: Health: Used ECETOC TRA model. Environment: Used ECETOC TRA model.	
Section 2 - Operating Conditions and Risk management measures	
2.1 - Operating Conditions related to human exposure	
Duration of exposure	Covers daily exposures up to 8 hours (unless stated differently)
Frequency of exposure	20 d/year
Physical form	Liquid
Vapour pressure	0,5-10 kPa at STP
Concentration of substance in preparation or article: Covers percentage substance in the product up to 100 % (unless stated differently)	
Temperature: Assumes activities are at ambient temperature (unless stated differently)	
2.2 - Risk management measures related to human health	
Organisational and Technical measures; Risk management measures (general): If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes. Formulate in enclosed or ventilated mixing vessels. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.	
Organisational and Technical measures; Risk management measures (specific - Contributing Scenario CS): **CS 1) Laboratory activities General exposures. Industrial.** Use suitable eye protection and gloves. **CS 2) Laboratory activities Roller, spreader, flow application. Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing. Industrial** Use suitable eye protection and gloves.	
2.3 - Operating Conditions related to environment	
Indoor/Outdoor use	
Product Characteristics: Substance is a unique structure. Liquid, vapour pressure 0.5 - 10 kPa at STP. Soluble in water (1-10g/l). Harmful to aquatic species. Readily biodegradable. Low bioaccumulation potential.	
Emission days per site	20 – Continuous release and batch operation
Amount used per site	0,000005 ton/year (0,000137 kg/day)
Environmental factors not influenced by risk management Local freshwater dilution factor: 9 Local marine water dilution factor: 90	
Initial release prior to Risk management measures	

Release fraction to air from process	0,5
Release fraction to wastewater from process	0,5
Release fraction to soil from process	0

2.4 - Risk management measures related to environment

Technical measures:
None

Organisational measures:
Bund storage facilities to prevent soil and water pollution in the event of spillage. Prevent environmental discharge consistent with regulatory requirements

Conditions and measures related to municipal sewage treatment plant:
Estimated substance removal from wastewater via domestic sewage treatment (%): 89,1.
Assumed domestic sewage treatment plant flow (m^3/d): 2000.

Conditions and measures related to external treatment of waste for disposal.
The substance is completely released to the environment or destroyed during use and no significant waste is generated. Dispose of waste product or used containers according to local regulations.

Conditions and measures related to external recovery of waste
Not applicable

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

Workers

	Inhalation (vapour)[1]		Dermal [2]
CONTRIBUTING SCENARIO	**Exposure (ppm)**	**RCR**	**Exposure (mg/kg/day)**
CS1 (8h)	10	0,1	0,34
CS2 (8h)	50	0,5	16,458

[1]Available hazard data do not support the need for a DNEL to be established for other health effects
[2]It is not possible to derive a DNEL for this end point

Environment

Compartment	Predicted environmental concentration	RCR
Microorganisms in STP	0,054 mg/l	<0,0001
Surface water	0,006 mg/l	0,003
Fresh water sediment	0,119 mg/kg dw	0,01
Sea water during emission episode	0,000588 mg/l	0,002
Marine sediment	0,012 mg/kg dw	0,009
Soil	0,02 mg/kg dw	0,00039

Section 4 - Guidance to Downstream User

Health

Inhalation (vapour): No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).
Dermal: To scale from a concentration of 5-25% to 100%, multiply by 1,7

Environment

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

$$\frac{m_{spERC} \times \left(1 - E_{ER,spERC}\right) \times F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} \times \left(1 - E_{ER,site}\right) \times F_{release,site}}{DF_{site}}$$

where: m_{spERC}: Substance use rate in spERC;
$E_{ER,spERC}$: Efficacy of RMM in spERC;
$F_{release,spERC}$: Initial release fraction in spERC;
DF_{spERC}: dilution factor of STP effluent in river;
m_{site}: Susbstance use rate at site;
$E_{ER,site}$: Efficacy of RMM at site;
$F_{release,site}$: Initial release fraction at site;
DF_{site}: dilution factor of STP effluent in river.

Not applicable for wide dispersive uses.

Exposure Scenario
m-tolylidene diisocyanate

Version:2 Revision date: 07/02/2019

Exposure scenario	Sector(s) of Use:	Process Category(ies):	Environmental Release Category(ies):
1. Intermediate for Manufacturing other Substances and Formulating, Repackaging & Distribution	SU 3, SU8, SU9, SU10	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8b, PROC9, PROC15	ERC2, ERC3, ERC6a
2. Industrial use	SU3	PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 14, PROC 15, PROC 21	ERC 2, ERC 3, ERC 5, ERC 6c
3. Professional use	SU22	PROC2, PROC3, PROC4, PROC5, PROC8a, PROC10, PROC14	ERC8c, ERC8f

Exposure Scenario
m-tolylidene diisocyanate

Section 1 - Exposure Scenario Title
ES1. Intermediate for Manufacturing other Substances and Formulating, Repackaging & Distribution
Description of activities/processes treated in the exposure scenario
Main User Group: **a) Intermediate for Manufacturing other Substances** **SU3** - Industrial uses: Uses of substances as such or in preparations at industrial sites **SU10 -** Manufacture of bulk, large scale chemicals (including petroleum products) **SU 10** Formulation [mixing] of preparations and/or re-packaging (excluding alloys) **b) Formulating, Repackaging & Distribution** **SU3** - Industrial uses: Uses of substances as such or in preparations at industrial sites **SU 10** Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
Process category **PROC 1** Use in closed process, no likelihood of exposure **PROC 2** Use in closed, continuous process with occasional controlled exposure (e.g. sampling) **PROC 3** Use in closed batch process (synthesis or formulation) **PROC 4** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC 5** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) **PROC 8b** Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities **PROC 9** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC 15** Use as a laboratory reagent
Environmental release category: **ERC2** - Formulation of preparations **ERC3 -** Formulation into solid matrix. **ERC6a -** Use of intermediate
Section 2 - Operating Conditions and Risk management measures
2.1 - Operating Conditions related to human exposure

Duration of exposure	8 h/day
Frequency of exposure	>300 d/year
Physical form	Liquid

Concentration of substance in preparation or article: max 100%
Temperature: Assumes use at not more than 20°C above ambient temperature, unless stated differently. Elevated temperatures in the range of 55 ºC to 110 ºC for PROC 1 and 5.
2.2 - Risk management measures related to human health
Organisational and Technical measures (general): Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. Provide local exhaust ventilation.
Organisational and Technical measures (specific): **PROC15**: Handle in a fume cupboard or under extract ventilation.
Risk management measures (general): Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin.
Risk management measures (specific):

PROC5: Wear a full face respirator TM3 conforming to EN147 with Type A filter or better.

2.3 - Operating Conditions related to environment

Indoor/Outdoor use	
Emission days per site	>300 - Continuous release
Fraction of EU tonnage used in region	1
Regional use tonnage	32.000 ton/year
Fraction of regional tonnage used locally	0,3125
Average local daily tonnage	33 ton
Abatement measures waste water	Wastewater emission controls are not applicable as there is no direct release to wastewater

Environmental factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

Used in open systems – Dry process

Release fraction to air from process	$3x10^{-4}$
Release fraction to wastewater from process	0
Release fraction to soil from process (regional only)	0

2.4 - Risk management measures related to environment

Organisational measures:

Common practices vary across sites thus conservative process release estimates used. Prevent discharge of un-dissolved substance to or recover from onsite wastewater

Abatement measures:

Waste water: Wastewater emission controls are not applicable as there is no direct release to wastewater
Waste air: No air emission controls required; required removal efficiency is 0%
Soil: Soil emission controls are not applicable as there is no direct release to soil

Waste management measures, necessary for risk management at different stages of the life cycle of substances (including mixtures or articles at the end of its life cycle):

Not applicable.

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

3.1.1 Workers

Measured data has been used to estimate worker exposure

PROC #	Inhalation exposure long term (mg/m^3)	RCR inhalation-Long term	Inhalation exposure short term (mg/m^3)	RCR inhalation short term
PROC 1	0,012	0,346	0,024	0,173
PROC 2	0,012	0,346	0,024	0,173
PROC 3	0,030	0,857	0,060	0,429
PROC 4	0,032	0,92	0,064	0,460
PROC 5	<0,001	0,013	0,001	0,006
PROC 8b	0,019	0,549	0,038	0,274
PROC 9	0,015	0,423	0,030	0,211
PROC 15	0,005	0,131	0,009	0,066

3.1.2 Environment

EUSES model to estimate environment exposure

Compartment	Predicted environmental concentration	Risk Characterisation Ratio
Air (µg/m3)	Not relevant	-
Freshwater (mg/l)	$4{,}14 \cdot 10^{-8}$	$3{,}31 \cdot 10^{-6}$
Marine water (mg/l)	$9{,}71 \cdot 10^{-10}$	$7{,}77 \cdot 10^{-7}$
Agricultural soil (mg/kg)	$8{,}37 \cdot 10^{-3}$	$< 8{,}37 \cdot 10^{-3}$
Grassland (mg/kg)	0,012	< 0,012
STP (mg/l)	Not relevant	-
Secondary poisoning	Not relevant	-
Human exposed via the environment	Not relevant	-

Section 4 - Guidance to Downstream User

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further information on the assumptions contained in this Exposure Scenario can be found at: ISOPA interpretation on selection of Use Descriptors (isopa.org).

Section 1 - Exposure Scenario Title

ES2. Industrial use

Description of activities/processes treated in the exposure scenario

Main User Group:
SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

Process category and Environmental Release Categories:

a) Industrial use for flexible foam
PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 14, PROC 15, PROC 21,
ERC 2, ERC 3, ERC 6c

b) Industrial use for Coatings
PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 15
ERC 2, ERC 3, ERC 5, ERC 6c

c) Industrial use for Adhesives and Sealants
PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 14, PROC 15
ERC 2, ERC 3, ERC 5, ERC 6c

d) Industrial use for Elastomers, TPU, Polyamide, Polyamide & synthetic Fibers
PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 9, PROC 15
ERC 2, ERC 3, ERC 6c

e) Industrial use for composite material
PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 13, PROC 14, PROC 15
ERC 2, ERC 3, ERC 5, ERC 6c

Processes, tasks, activities covered

PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging, blowline injections, blender operations)

PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed moulding, sawing in cabinet, during sampling, charging, discharging, maintenance, equipment cleaning, occasional interventions)

PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, during sampling, maintenance, equipment cleaning, occasional interventions)

PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyor or in box, open sawing, during casting, other open uses, during sampling, maintenance, equipment cleaning, occasional interventions (at open areas))

PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)

PROC 7: Industrial spraying

PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)

PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)

PROC 10: Roller application or brushing

PROC 13: Treatment of articles by dipping and pouring

PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation

PROC 15: Use as laboratory reagent

PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting)

Section 2 - Operating Conditions and Risk management measures

2.1 - Operating Conditions related to human exposure

Duration of exposure	8 h/day

Frequency of exposure	>300 d/year
Physical form	Liquid
Concentration of substance in preparation or article: Covers percentage substance in the product up to 100 %. **Exceptions**: PROC 7 and PROC 10 small scale up to 60%, PROC 10 large scale, up to 0.6%, PROC 14 up to 85% and PROC 21 up to 1%.	
Temperature: Assumes use at not more than 20°C above ambient temperature, unless stated differently. Elevated temperatures in the range of 55 ºC to 110 ºC for PROC 1, PROC 5 and PROC14.	

2.2 - Risk management measures related to human health

Organisational and Technical measures (general):
Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. Provide local exhaust ventilation.

Organisational and Technical measures (specific):
PROC7: Limit the substance content in the product to 60%
PROC10 - Roller application or brushing – small scale (≤10 m^2):
Limit the substance content in the product to 60%
PROC10 - Roller application or brushing – large scale (>10 m^2):
Limit the substance content in the product to 0.6%
a) If the treated surface area (m^2) > 0,6 times the volume of the room (m^3):
Provide a good standard of controlled ventilation (10 to 15 air changes per hour)
b) if the treated surface area (m^2) ≤ 0,6 6 times the volume of the room (m^3):
Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
PROC14: Limit the substance content in the product to 85%.
PROC15: Handle in a fume cupboard or under extract ventilation.
PROC21: Limit the substance content in the product to 1 %.

Risk management measures (general):
Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin.

Risk management measures (specific):
PROC5-PROC7: Wear a full face respirator TM3 conforming to EN147 with Type A filter or better.
PROC14: Wear a full face respirator TM3 conforming to EN147 with Type A filter or better; or demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.

2.3 - Operating Conditions related to environment

Indoor/Outdoor use	
Emission days per site	>300 - Continuous release
Fraction of EU tonnage used in region	1
Regional use tonnage	32.000 ton/year (All industrial uses except flexible foam) 448.000 ton/year (Industrial use of flexible foam)
Fraction of regional tonnage used locally	0,3125 (All industrial uses except flexible foam) 0,0223 (Industrial use of flexible foam)
Average local daily tonnage	33 ton
Abatement measures waste water	Wastewater emission controls are not applicable as there is no direct release to wastewater
Environmental factors not influenced by risk management	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
Other given operational conditions affecting environmental exposure	

Used in open systems – Dry process

Release fraction to air from process $3x10^{-4}$ (All industrial uses except flexible foam)
$9,0x10^{-5}$ (Industrial use of flexible foam)

Release fraction to wastewater from process 0

Release fraction to soil from process (regional only) 0

2.4 - Risk management measures related to environment

Organisational measures:

Common practices vary across sites thus conservative process release estimates used. Prevent discharge of un-dissolved substance to or recover from onsite wastewater.

Abatement measures:

Waste water: Wastewater emission controls are not applicable as there is no direct release to wastewater

Waste air: No air emission controls required; required removal efficiency is 0%

Soil: Soil emission controls are not applicable as there is no direct release to soil

Waste management measures, necessary for risk management at different stages of the life cycle of substances (including mixtures or articles at the end of its life cycle):

Not applicable.

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

3.1.1 Workers

Measured data has been used to estimate worker exposure

PROC #	Inhalation exposure long term (mg/m^3)	RCR inhalation-Long term	Inhalation exposure short term (mg/m^3)	RCR inhalation short term
PROC 1	0,012	0,346	0,024	0,173
PROC 2	0,012	0,346	0,024	0,173
PROC 3	0,030	0,857	0,060	0,429
PROC 4	0,032	0,92	0,064	0,460
PROC 5	<0,001	0,013	0,001	0,006
PROC7	0,022	0,622	0,044	0,311
PROC 8b	0,019	0,549	0,038	0,274
PROC 9	0,015	0,423	0,030	0,211
PROC10 small scale (≤10 m^2)	0,033	0,954	0,067	0,477
PROC10 large scale (>10 m^2)	0,035	0,997	0,0698	0,499
PROC13	0,007	0,207	0,015	0,104
PROC14	0,001	0,026	0,002	0,013
PROC 15	0,005	0,131	0,009	0,066
PROC21	0,004	0,113	0,008	0,057

3.1.2 Environment

Exposure Scenario
m-tolylidene diisocyanate

EUSES model to estimate environment exposure

Compartment	Predicted environmental concentration	Risk Characterisation Ratio
Air (µg/m3)	Not relevant	-
Freshwater (mg/l)	$4{,}14 \cdot 10^{-8}$	$3{,}31 \cdot 10^{-6}$
Marine water (mg/l)	$9{,}71 \cdot 10^{-10}$	$7{,}77 \cdot 10^{-7}$
Agricultural soil (mg/kg)	0,026*	<0,026
Grassland (mg/kg)	0,037*	<0,037
STP (mg/l)	Not relevant	-
Secondary poisoning	Not relevant	-
Human exposed via the environment	Not relevant	-

* These values are for all uses, except industrial use of TDI containing Flexible foam. For this use, the PECs in agriculutral soil and grassland are $8{,}37 \times 10^{-2}$ and 0,012 mg/kg respectively

Section 4 - Guidance to Downstream User

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further information on the assumptions contained in this Exposure Scenario can be found at: ISOPA interpretation on selection of Use Descriptors (isopa.org).

Section 1 - Exposure Scenario Title

ES3. Professional use

Description of activities/processes treated in the exposure scenario

Main User Group:
SU22 – Professional uses

Process category and Environmental Release Categories:
a) Professional use for Coatings
PROC 5, PROC 8a, PROC 10
ERC 8c, ERC 8f
b) Professional use for Adhesives and Sealants
PROC 4, PROC 5, PROC 8a, PROC 10
ERC 8c, ERC 8f
c) Professional use for composite material
PROC 2, PROC 3, PROC 5, PROC 8a, PROC 14
ERC 8c, ERC 8f

Processes, tasks, activities covered
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions)
PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions)
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during use, maintenance/cleaning/incidental interventions)
PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)
PROC 10: Roller application or brushing (e.g. One Component Foam use)
PROC 14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation

Section 2 - Operating Conditions and Risk management measures

2.1 - Operating Conditions related to human exposure

Duration of exposure	8 h/day
Frequency of exposure	>300 d/year
Physical form	Liquid

Concentration of substance in preparation or article: Covers percentage substance in the product up to 100 %.
Exceptions: PROC 10 small scale up to 60%, PROC 10 large scale, up to 0.6%, PROC 14 up to 85%.

Temperature: Assumes use at not more than 20°C above ambient temperature, unless stated differently. Elevated temperatures in the range of 55 ºC to 110 ºC for PROC 5 and PROC14.

2.2 - Risk management measures related to human health

Organisational and Technical measures (general):
Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. Provide local exhaust ventilation.

Organisational and Technical measures (specific):
PROC10 - Roller application or brushing – small scale (≤10 m^2):
Limit the substance content in the product to 60%
PROC10 - Roller application or brushing – large scale (>10 m^2):
Limit the substance content in the product to 0.6%

a) If the treated surface area (m^2) > 0,6 times the volume of the room (m^3):
Provide a good standard of controlled ventilation (10 to 15 air changes per hour)
b) if the treated surface area (m^2) ≤ 0,6 6 times the volume of the room (m^3):
Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour)
PROC14: Limit the substance content in the product to 85%.
PROC15: Handle in a fume cupboard or under extract ventilation.

Risk management measures (general):
Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin.

Risk management measures (specific):
PROC5: Wear a full face respirator TM3 conforming to EN147 with Type A filter or better.
PROC14: Wear a full face respirator TM3 conforming to EN147 with Type A filter or better; or demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.

2.3 - Operating Conditions related to environment

Indoor/Outdoor use	
Emission days per site	>300 - Continuous release
Fraction of EU tonnage used in region	1
Regional use tonnage	32.000 ton/year
Fraction of regional tonnage used locally	$2,0x10^{-3}$
Average local daily tonnage	175kg
Abatement measures waste water	Wastewater emission controls are not applicable as there is no direct release to wastewater

Environmental factors not influenced by risk management

Local freshwater dilution factor:	10
Local marine water dilution factor:	100

Other given operational conditions affecting environmental exposure

Used in open systems – Dry process

Release fraction to air from process	0,15
Release fraction to wastewater from process	0,01
Release fraction to soil from process (regional only)	$5,0x10^{-3}$

2.4 - Risk management measures related to environment

Organisational measures:
Common practices vary across sites thus conservative process release estimates used. Prevent discharge of un-dissolved substance to or recover from onsite wastewater.

Abatement measures:

Waste water:	Estimated substance removal from wastewater via domestic sewage treatment is 11% Assumed domestic sewage treatment plant flow is 2000 m^3/d
Waste air:	No air emission controls required; required removal efficiency is 0%
Soil:	Soil emission controls are not applicable as there is no direct release to soil

Waste management measures, necessary for risk management at different stages of the life cycle of substances (including mixtures or articles at the end of its life cycle):
Not applicable.

Section 3 - Estimation of exposure information

3.1 - Estimation of exposure

3.1.1 Workers

Measured data has been used to estimate worker exposure

PROC #	Inhalation exposure long term (mg/m^3)	RCR inhalation-Long term	Inhalation exposure short term (mg/m^3)	RCR inhalation short term
PROC 2	0,012	0,346	0,024	0,173
PROC 3	0,030	0,857	0,060	0,429
PROC 4	0,032	0,92	0,064	0,460
PROC 5	<0,001	0,013	0,001	0,006
PROC 8a	0,007	0,207	0,015	0,104
PROC10 small scale (≤10 m^2)	0,033	0,954	0,067	0,477
PROC10 large scale (>10 m^2)	0,035	0,997	0,0698	0,499
PROC14	0,001	0,026	0,002	0,013

3.1.2 Environment

EUSES model to estimate environment exposure

Compartment	Predicted environmental concentration	Risk Characterisation Ratio
Air (µg/m3)	Not relevant	-
Freshwater (mg/l)	$5{,}75 \cdot 10^{-7}$	$4{,}60 \cdot 10^{-5}$
Marine water (mg/l)	$8{,}75 \cdot 10^{-4}$	0,7
Agricultural soil (mg/kg)	$1 \cdot 10^{-3}$	$<1 \cdot 10^{-3}$
Grassland (mg/kg)	$1{,}01 \cdot 10^{-3}$	$<1{,}01 \cdot 10^{-3}$
STP (mg/l)	Not relevant	-
Secondary poisoning	Not relevant	-
Human exposed via the environment	Not relevant	-

Section 4 - Guidance to Downstream User

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Further information on the assumptions contained in this Exposure Scenario can be found at: ISOPA interpretation on selection of Use Descriptors (isopa.org).

Exposure Scenario
m-tolylidene diisocyanate

Abbreviations and acronyms

B bioaccumulation
BCF Bioconcentration factor
ECETOC European Centre for Ecotoxicology and Toxicology of Chemicals
ES Exposure Scenario
ERC Environmental release category
LEV Local exhaust ventilation
PC Chemical product category
PEC Predicted Environmental Concentration
PNEC Predicted No-Effect Concentration
PPE Personal Protective Equipment
PROC Process category
RCR Risk Characterisation Ratio
RMM Risk Reduction Measure
SCOEL Scientific Committee on Occupational Exposure Limit
STP Sewage Treatment Plant
SU Sector of use
TRA Targeted Risk Assessment
TWA value Time Weighted Average value
vB Very Bioaccumulative
WWTP Waste Water Treatment Plant

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