SAFETY DATA SHEET

according to REACH Regulation (EC) No. 1907/2006, as amended by UK REACH Regulations SI 2019/758

n-Butylamine
10440

Version / Revision	7	**Revision Date**	11-Apr-2025
Supersedes Version	6.00***	**Issuing date**	11-Apr-2025

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

1.1. Product identifier

Identification of the substance/preparation **n-Butylamine**

CAS-No 109-73-9
EC No. 203-699-2

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

Identified uses Intermediate
Formulation
Distribution of substance
laboratory chemicals

Uses advised against None

1.3. Details of the supplier of the safety data sheet

Company/Undertaking Identification
OXEA GmbH
Rheinpromenade 4A
D-40789 Monheim
Germany***

Product Information
Product Stewardship
FAX: +49 (0)208 693 2053
email: sc.psq@oxea.com

1.4. Emergency telephone number

Emergency telephone number +44 (0) 1235 239 670 (UK)
available 24/7

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is classified based on Directive 1272/2008/EC and its amendments (CLP Regulation)

Flammable liquid Category 2, H225
Acute oral toxicity Category 4, H302
Acute dermal toxicity Category 3, H311
Acute inhalation toxicity Category 3, H331
Skin corrosion/irritation Category 1A, H314
Serious eye damage/eye irritation Category 1, H318
Target Organ Systemic Toxicant - Single exposure Category 3, H335

Additional information
For full text of Hazard- and EU Hazard-statements see SECTION 16.

2.2. Label elements

Labelling according to Regulation 1272/2008/EC and its amendments (CLP Regulation).

Hazard pictograms



Signal word	**Danger**
Hazard statements	H225: Highly flammable liquid and vapour. H302: Harmful if swallowed. H311: Toxic in contact with skin. H331: Toxic if inhaled. H314: Causes severe skin burns and eye damage. H335: May cause respiratory irritation.
Precautionary statements	P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233: Keep container tightly closed. P260: Do not breathe gas/mist/vapours. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P321: Specific treatment: IF ON SKIN: Wash off with 3% acetic acid followed by large amounts of plain water for at least 5 min as a final step. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310: Immediately call a POISON CENTER/doctor. P403 + P235: Store in a well ventilated place. Keep cool.

2.3. Other hazards

Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback
Components of the product may be absorbed into the body by inhalation and through the skin

PBT and vPvB assessment	This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)
Endocrine disrupting assessments	The substance is not listed on the candidate list according to Art. 59(1), REACh. The substance was not assessed as having endocrine disrupting properties according to regulation 2017/2100/EU or 2018/605/EU.

SECTION 3: Composition / information on ingredients

3.1. Substances

Component	CAS-No	1272/2008/EC	Concentration (%)
Butylamine	109-73-9	Flam. Liq. 2; H225 Acute Tox. 4; H302	> 99,5

		Acute Tox. 3; H311 Acute Tox. 3, H331 Skin Corr. 1A; H314 Eye Dam. 1; H318 STOT SE 3; H335 (>=1%) ATE = 372 mg/kg (oral) ATE = 429 mg/kg (dermal) ATE = 4,3 mg/L (inhalation) (vapours)	

For full text of Hazard- and EU Hazard-statements see SECTION 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation
Keep at rest. Aerate with fresh air. Call a physician immediately. Symptoms of poisoning may develop many hours after exposure.

Skin
Wash off with 3% acetic acid followed by large amounts of plain water for at least 5 min as a final step. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.

Eyes
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. Immediate medical attention is required.

Ingestion
Call a physician immediately. Do not induce vomiting without medical advice.

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

Main symptoms
shortness of breath, convulsions, cough, hypertensive effect, headache, vomiting, allergic reactions, nausea, unconsciousness.

Special hazard
Stomach perforation, Lung oedema.

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

General advice
Remove contaminated, soaked clothing immediately and dispose of safely. First aider needs to protect himself.

Treat as an alkaline substance (similar to ammonia). If ingested, irrigate the stomach. Treat skin and mucous membranes with antihistamine and corticoids. In case of lung irritation, first treatment with cortisone spray. Symptoms may be delayed. Later control for pneumonia and lung oedema.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media
alcohol-resistant foam, dry chemical, carbon dioxide (CO2), water spray

Unsuitable Extinguishing Media

Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Under conditions giving incomplete combustion, hazardous gases produced may consist of:
carbon monoxide (CO)
carbon dioxide (CO2)
nitrogen oxides (NOx)
Combustion gases of organic materials must in principle be graded as inhalation poisons
Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback

5.3. Advice for firefighters

Special protective equipment for firefighters
Fire fighter protection should include a self-contained breathing apparatus (NIOSH-approved or EN 133) and full fire-fighting turn out gear.

Precautions for firefighting
Cool containers / tanks with water spray. Dike and collect water used to fight fire. Water run-off and vapor cloud may be corrosive. Keep people away from and upwind of fire.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: For personal protective equipment see section 8. Avoid contact with skin and eyes. Avoid breathing vapors or mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation, especially in confined areas. Keep away from heat and sources of ignition.
For emergency responders: Personal protection see section 8.

6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge product into the aquatic environment without pretreatment (biological treatment plant).

6.3. Methods and material for containment and cleaning up

Methods for containment
Stop the flow of material, if possible without risk. Dike spilled material, where this is possible.

Methods for cleaning up
Soak up with inert absorbent material. DO NOT use combustible materials such as sawdust. Keep in suitable, closed containers for disposal. If liquid has been spilt in large quantities clean up promptly by scoop or vacuum. Dispose of in accordance with local regulations. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours).

6.4. Reference to other sections

For personal protective equipment see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Further info may be available in the appropriate Exposure scenarios in the annex to this SDS.

Advice on safe handling
Avoid contact with skin, eyes and clothing. Do not use compressed air for filling, discharging or handling. Wash hands before breaks and immediately after handling the product. Provide sufficient air exchange and/or exhaust in work rooms. Refill and handle product only in closed system.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on the protection of the environment
See Section 8: Environmental exposure controls.

Incompatible products
strong acids
oxidizing agents

7.2. Conditions for safe storage, including any incompatibilities

Advice on protection against fire and explosion
Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours). In case of fire, emergency cooling with water spray should be available. Ground and bond containers when transferring material. Vapour is heavier than air and can travel considerable distance to a source of ignition and flashback.

Technical measures/Storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Handle and open container with care. Handle under nitrogen, protect from moisture. Keep at temperatures between -18 and 38 °C (0 and 100 °F).

Temperature class
T2

7.3. Specific end use(s)

Intermediate
Formulation
Distribution of substance
laboratory chemicals
For specific end use information see the annex of this safety data sheet

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Exposure limits European Union

No exposure limits established

Exposure limits UK

No exposure limits established.

DNEL & PNEC

Butylamine, CAS: 109-73-9
Workers

DN(M)EL - long-term exposure - systemic effects - Inhalation	6,1 mg/m³
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	12,2 mg/m³
DN(M)EL - long-term exposure - local effects - Inhalation	6,1 mg/m³
DN(M)EL - acute / short-term exposure - local effects - Inhalation	12,2 mg/m³
DN(M)EL - long-term exposure - systemic effects - Dermal	Hazard unknown (no further information necessary)
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Dermal	High hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - local effects - Dermal	High hazard (no threshold derived)
DN(M)EL - local effects - eyes	Medium hazard (no threshold derived)

General population

DN(M)EL - long-term exposure - systemic effects - Inhalation	0,77 mg/m³
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Medium hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Inhalation	High hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - local effects - Inhalation	High hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Dermal	Hazard unknown (no further information necessary)
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	Medium hazard (no threshold derived)
DN(M)EL - long-term exposure - local effects - Dermal	High hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - local effects - Dermal	High hazard (no threshold derived)
DN(M)EL - long-term exposure - systemic effects - Oral	High hazard (no threshold derived)
DN(M)EL - acute / short-term exposure - systemic effects - Oral	No hazard identified
DN(M)EL - local effects - eyes	Medium hazard (no threshold derived)

Environment

PNEC aqua - freshwater	21,8 µg/l
PNEC aqua - marine water	2,18 µg/l
PNEC aqua - intermittent releases	82 µg/l
PNEC STP	600 mg/l
PNEC sediment - freshwater	0.173 mg/kg dw
PNEC sediment - marine water	17,3 µg/kg dw
PNEC Air	No hazard identified
PNEC soil	21,74 µg/kg dw
Secondary poisoning	No potential for bioaccumulation

8.2. Exposure controls

Special adaptations (REACh)

Not applicable.

Appropriate Engineering controls
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Personal protective equipment

General industrial hygiene practice
Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Ensure that eyewash stations and safety showers are close to the workstation location.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Eye protection
Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.
Equipment should conform to EN 166

Hand protection
Wear protective gloves. Recommendations are listed below. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Suitable material	Viton
Evaluation	according to EN 374: level 3
Glove thickness	approx 0,5 mm
Break through time	approx 40 min

Suitable material	polyvinylchloride
Evaluation	Information derived from practical experience
Glove thickness	approx 0,8 mm

Skin and body protection
Impervious clothing. Wear face-shield and protective suit for abnormal processing problems.

Respiratory protection
Respirator with A filter. Full mask with above mentioned filter according to producers using requirements or self-contained breathing apparatus. Equipment should conform to EN 136 or EN 140 and EN 143.

Environmental exposure controls
Use product only in closed system. If leakage can not be prevented, the substance needs to be suck off at the emersion point, if possible without danger. Observe the exposure limits, clean exhaust air if needed. If recycling is not practicable, dispose of in compliance with local regulations. Inform the responsible authorities in case of leakage into the atmosphere, or of entry into waterways, soil or drains.

Additional advice
Further details on substance data can be found in the registration dossier under the following link: http://echa.europa.eu/information-on-chemicals/registered-substances. For specific exposure controls see the annex to this safety data sheet.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	liquid @ 20 °C (68 °F)
Colour	colourless
Odour	ammonia-like
Odour threshold	1,8 µl/l
Melting point/freezing point	-47 °C (Pour point) @ 1013 hPa
Method	DIN ISO 3016
Boiling point or initial boiling point and boiling range	77 °C @ 1013 hPa
Method	OECD 103
Flammability	Ignitable
Lower explosion limit	1,7 Vol %
Upper explosion limit	10 Vol %
Flash point	-7,5 °C
Method	ISO 13736
Autoignition temperature	320 °C
Method	DIN 51794
Decomposition temperature	No data available
pH	13 (50 % in water @ 25 °C (77 °F)) DIN 19268
Kinematic Viscosity	0,693 mm²/s @ 20 °C
Method	ASTM D445
Solubility	> 424 g/l @ 20 °C, miscible, in water, OECD 105
Partition coefficient n-octanol/water (log value)	0 @ 25 °C (77 °F) OECD 117

Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
102	10,2	0,101	20	68	DIN EN 13016-2
369	36,9	0,364	50	122	DIN EN 13016-2

Density and/or relative density

Values	@ °C	@ °F	Method
0,736	20	68	DIN 51757

Relative vapour density	2,5 (Air = 1) @ 20 °C (68 °F)
Particle characteristics	not applicable

9.2. Other information

Explosive properties	Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties
Oxidizing properties	Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties
Molecular weight	73,14
Molecular formula	C4 H11 N
log Koc	1,64 @ 22,5°C (72,5 °F) OECD 106
Dissociation constant	pKa 10,8 @ 23,5 °C (74,3 °F) OECD 112
Refractive index	1,401 @ 20 °C
Surface tension	69,5 mN/m (1 g/l @ 20°C (68°F)), OECD 115
Evaporation rate	No data available

SECTION 10: Stability and Reactivity

10.1. Reactivity

The reactivity of the product corresponds to the typical reactivity shown by the substance group as described in any text book on organic chemistry.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerisation does not occur.

10.4. Conditions to avoid

Avoid contact with heat, sparks, open flame and static discharge. Avoid any source of ignition.

10.5. Incompatible materials

strong acids, oxidizing agents.

10.6. Hazardous decomposition products

No decomposition if stored and applied as directed. If heated to thermal decomposition the following decomposition products may occur depending on the conditions. carbon monoxide (CO). nitrogen oxides (NOx). cyanides. nitric acid. nitriles.

SECTION 11: Toxicological information

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

Likely routes of exposure Inhalation, Eye contact, Skin contact, Ingestion

Acute toxicity				
Butylamine (109-73-9)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	372 mg/kg	rat, male/female	OECD 401
Dermal	LD50	1100 mg/kg	guinea pig male	21 CFR 191.10
Dermal	LD50	429 mg/kg	guinea pig male	21 CFR 191.10
Inhalative	LC50	> 4,2 mg/l (4h)	rat, male/female	OECD 403

Butylamine, CAS: 109-73-9
Assessment
The available data lead to the classification given in section 2

Irritation and corrosion				
Butylamine (109-73-9)				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	corrosive	OECD 404	1 min
Eyes	rabbit	corrosive		
Respiratory tract	mouse	RD50: 84 - 112 ppm		15 - 60 min

Butylamine, CAS: 109-73-9
Assessment
The available data lead to the classification given in section 2

Sensitization				
Butylamine (109-73-9)				
Target Organ Effects	Species	Evaluation	Method	

Skin	guinea pig	not sensitizing	OECD 406	2 %, aqueous solution

Butylamine, CAS: 109-73-9
Assessment
Based on available data, the classification criteria are not met for:
Skin sensitization
For respiratory sensitization, no data are available

Subacute, subchronic and prolonged toxicity				
Butylamine (109-73-9)				
Type	Dose	Species	Method	
Subacute toxicity	NOAEL: < 17 ppm/d (14 d)	rat, female	OECD 412	Inhalation

Butylamine, CAS: 109-73-9
Assessment
Based on available data, the classification criteria are not met for:
STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity					
Butylamine (109-73-9)					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		Salmonella typhimurium	negative	OECD 471 (Ames)	In vitro study
Mutagenicity		mouse	negative	OECD 474	in vivo
Mutagenicity		mouse lymphoma cells	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Reproductive toxicity	NOAEC: 500 mg/m³	rat, parental		OECD 415	read across
Reproductive toxicity	NOAEC: 500 mg/m³	Rat, prenatal		OECD 415	read across
Developmental Toxicity	LOAEC: 51 mg/m³	rat		OECD 412 Inhalation	Maternal toxicity
Developmental Toxicity	NOAEC: 460 mg/m³	rat		OECD 412 Inhalation	Developmental toxicity
Developmental Toxicity	NOAEL 100 mg/kg/d	rat		OECD 414, Oral	Teratogenicity read across
Developmental Toxicity	NOAEL 400 mg/kg/d	rat		OECD 414, Oral	Maternal toxicity read across
Developmental Toxicity	LOAEL 400 mg/kg/d	rat		OECD 414, Oral	Teratogenicity read across

Butylamine, CAS: 109-73-9
CMR Classification
The available data on CMR properties are summarized in the table above. They do not indicate a classification into categories 1A or 1B
Evaluation
In vitro tests did not show mutagenic effects
No reprotoxic effects in the absence of maternal toxicity
In the absence of specific alerts no cancer testing is required

Butylamine, CAS: 109-73-9
Main symptoms

shortness of breath, convulsions, cough, hypertensive effect, headache, vomiting, allergic reactions, nausea, unconsciousness.
Target Organ Systemic Toxicant - Single exposure
The available data lead to the classification given in section 2
Target Organ Systemic Toxicant - Repeated exposure
Based on available data, the classification criteria are not met for:
STOT RE
Aspiration toxicity
Due to the viscosity, this product does not present an aspiration hazard

11.2. Information on other hazards

Endocrine disrupting properties
The substance has not been identified as having endocrine disrupting properties in accordance with section 2.3.
Butylamine, CAS: 109-73-9
Other adverse effects
Components of the product may be absorbed into the body by inhalation and through the skin.
Note
Handle in accordance with good industrial hygiene and safety practice. Further details on substance data can be found in the registration dossier under the following link:
http://echa.europa.eu/information-on-chemicals/registered-substances.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity			
Butylamine (109-73-9)			
Species	Exposure time	Dose	Method
Pimephales promelas (fathead minnow)	96h	LC50: 268 mg/l	OECD 203
Lepomis macrochirus (Bluegill sunfish)	96h	LC50: 32 mg/l	OECD 203
Pseudomonas putida	16 h	NOEC: 65 mg/l	DIN 38412, part 8
Pseudomonas putida	16 h	EC0: > 800 mg/l (neutralized)	DIN 38412, part 8
Daphnia magna (Water flea)	48h	EC50: 8,3 mg/l	Mobility
Daphnia magna (Water flea)	48h	NOEC: 5,7 mg/l	Mobility
Desmodesmus subspicatus	72h	EC50: 17 mg/l (Growth rate)	OECD 201
Menidia beryllina	72h	LC50: 24 mg/l	OECD 203
Pseudomonas putida	16 h	TTC: 800 mg/l (neutralized)	ISO 10712
Pseudomonas putida	16 h	TTC: 65 mg/l (not neutralized)	ISO 10712
Ceriodaphnia dubia	48h	LC50: 8,2 mg/l	Mortality
Ceriodaphnia dubia	48h	NOEC: 5,7 mg/l	Mortality

Long term toxicity				
Butylamine (109-73-9)				
Type	Species	Dose	Method	
Mortality Reproductive toxicity	Ceriodaphnia dubia	LOEC: 2,22 mg/l/7d	OECD 211	
Mortality Reproductive	Ceriodaphnia dubia	NOEC: 1,09 mg/l	OECD 211	

toxicity		(7d)		
Aquatic toxicity	Desmodesmus subspicatus	NOEC: 2,26 mg/l (3d)	OECD 201 Growth inhibition	

12.2. Persistence and degradability

Butylamine, CAS: 109-73-9
Biodegradation
85 % (14 d), activated sludge, aerobic, OECD 301 C.

Abiotic Degradation		
Butylamine (109-73-9)		
Type	Result	Method
Hydrolysis	not expected	
Photolysis	Half-life (DT50): 11,2 h	SRC AOP v1.92

12.3. Bioaccumulative potential

Butylamine (109-73-9)		
Type	Result	Method
log Pow	0 @ 25 °C (77 °F)	OECD 117
BCF	~ 3,2	calculated

12.4. Mobility in soil

Butylamine (109-73-9)		
Type	Result	Method
Surface tension	69,5 mN/m (1 g/l @ 20°C (68°F))	OECD 115
Adsorption/Desorption	log koc: 1,64 @ 22,5 °C (72,5 °F)	OECD 106
Distribution to environmental compartments	Percent distribution in Media: Air: 20,1% Soil: 0,04% Water: 79,8% Sediment: 0,04% Suspended sediment: 0% Biota: 0%	calculated

12.5. Results of PBT and vPvB assessment

Butylamine, CAS: 109-73-9
PBT and vPvB assessment
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT), nor very persistent nor very bioaccumulating (vPvB)

12.6. Endocrine disrupting properties

The substance has not been identified as having endocrine disrupting properties in accordance with section 2.3.

12.7. Other adverse effects

Butylamine, CAS: 109-73-9
No data available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product Information
Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.
Hazardous waste according to European Waste Catalogue (EWC)

Uncleaned empty packaging
Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

Section 14.1 - 14.6

ADR/RID

14.1. UN number or ID number	UN 1125
14.2. UN proper shipping name	n-Butylamine
14.3. Transport hazard class(es)	3
Subsidiary Risk	8
14.4. Packing group	II
14.5. Environmental hazards	no
14.6. Special precautions for user	
ADR Tunnel restriction code	(D/E)
Classification Code	FC
Hazard Number	338

ADN ADN Container

14.1. UN number or ID number	UN 1125
14.2. UN proper shipping name	n-Butylamine
14.3. Transport hazard class(es)	3
Subsidiary Risk	8
14.4. Packing group	II
14.5. Environmental hazards	no
14.6. Special precautions for user	
Classification Code	FC
Hazard Number	338

ICAO-TI / IATA-DGR

14.1. UN number or ID number	UN 1125
14.2. UN proper shipping name	n-Butylamine
14.3. Transport hazard class(es)	3
Subsidiary Risk	8
14.4. Packing group	II
14.5. Environmental hazards	no
14.6. Special precautions for user	no data available

IMDG

14.1. UN number or ID number	UN 1125
14.2. UN proper shipping name	Butylamine
14.3. Transport hazard class(es)	3
Subsidiary Risk	8
14.4. Packing group	II
14.5. Environmental hazards	no
14.6. Special precautions for user	
EmS	F-E, S-C
14.7. Maritime transport in bulk according to IMO instruments	
Product name	Butylamine
Ship type	2
Pollution category	Y
Hazard class	S/P

SECTION 15: Regulatory information

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

Regulation 1272/2008, Annex VI

Butylamine, CAS: 109-73-9

Classification	Flam. Liq. 2; H225 Acute Tox. 4*; H332 Acute Tox. 4*; H312 Acute Tox. 4*; H302 Skin Corr. 1A; H314 STOT SE 3; H335 (C>=1%)
Hazard pictograms	GHS02 Flame GHS05 Corrosion GHS07 Exclamation mark
Signal word	Danger
Hazard statements	H225, H302, H312, H314, H332, H335

DI 2012/18/EU (Seveso III)

Category	Annex I, part 1: H2 P5a - c; depending on conditions

VOC according to DI 2010/75/EU (Industry Emission Directive)

Component	Status
Butylamine CAS: 109-73-9	regulated

The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 No. 758

Component	Status
Butylamine CAS: 109-73-9	The substance will not be pre-registered

For details and further information please refer to the original regulation.

International Inventories

Butylamine, CAS: 109-73-9
AICS (AU)
DSL (CA)
IECSC (CN)
EC-No. 2036992 (EU)
ENCS (2)-132 (JP)
ISHL (2)-132 (JP)
KECI KE-03750 (KR)
INSQ (MX)
PICCS (PH)
TSCA (US)
NZIoC (NZ)
TCSI (TW)

National regulatory information Great Britain

Releases to air (Pollution Inventory Substances)
not subject

Releases to water (Pollution Inventory Substances)
not subject

Releases to sewer (Pollution Inventory Substances)
not subject
For details and further information please refer to the original regulation

15.2. Chemical safety assessment

The Chemical Safety Report (CSR) has been generated. For Exposure Scenarios see the annex.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3
H225: Highly flammable liquid and vapour.
H302: Harmful if swallowed.
H311: Toxic in contact with skin.
H331: Toxic if inhaled.
H314: Causes severe skin burns and eye damage.
H318: Causes serious eye damage.
H335: May cause respiratory irritation.

Abbreviations
A table of terms and abbreviations can be found under the following link:
http://echa.europa.eu/documents/10162/13632/information_requirements_r20_en.pdf

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

Sources of key data used to compile the datasheet

Information contained in this safety data sheet is based on OXEA owned data and public sources deemed valid or acceptable. The absence of data elements required by OSHA, ANSI or Annex II, Regulation 1907/2006/EC indicates, that no data meeting these requirements is available.

Further information for the safety data sheet
Changes against the previous version are marked by ***. Observe national and local legal requirements. For more information, other material safety data sheets or technical data sheets please consult the OXEA homepage (www.oxae.com).

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End of Safety Data Sheet

Annex to the extended Safety Data Sheet (eSDS)

General information

A quantitative approach used to conclude safe use for:
Environmental compartment
Acute local hazards via inhalation
Acute systemic hazards via inhalation
Long term local hazards via inhalation
Long-term Systemic effects via inhalation
A qualitative approach used to conclude safe use for:
Long term local hazards via skin
Acute local hazards via skin
Acute systemic hazards via skin
Long-term Systemic effects via skin
Local hazards via eyes

Other combinations of operational conditions may also be safe. Please contact OXEA in case your local operational conditions differ from the ones described below and you are unsure if they are also safe

Operational conditions and risk management measures
Following operational conditions and risk management measures, are based on qualitative risk characterisation:
Containment of source except for short term exposure (e.g. taking sample)
Any measure to eliminate exposure should be considered
Design closed system to allow for easy maintenance
If possible keep equipment under negative pressure
Control staff entry to work area
Ensure all equipment well maintained
Permit to work for maintenance work
Regular cleaning of equipment and work area
Training for staff on good practice
Procedures and training for emergency decontamination and disposal
Good standard of personal hygiene
Recording of any 'near miss' situations
Ensure segregation of worker from the source.

Minimization of manual phases
Avoid contact with contaminated tools and objects.
Regular cleaning of equipment and work area
Minimize number of staff exposed
Effective contaminant extraction
Substance/task appropriate gloves
Skin coverage with appropriate barrier material based on potential for contact with chemicals
Chemical goggles or safety glasses
Substance/Task appropriate respirator, based on potential exposure to the use
Wear suitable face shield.
Supervision in place to check that the RMMs in place are being used correctly and OCs followed.

Exposure scenario identification

1 Industrial use resulting in manufacture of another substance (use of intermediates)
2 Formulation & (re)packing of substances and mixtures
3 Distribution of substance
4 Use in laboratories

Number of the ES 1

Short title of the exposure scenario
Industrial use resulting in manufacture of another substance (use of intermediates)

List of use descriptors

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
SU9: Manufacture of fine chemicals

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises

Environmental release categories [ERC]
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use as an intermediate (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (ncluding marine vessel/barge, road/rail car and bulk container).

Further explanations
Industrial use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Number of the contributing scenario 1

Contributing exposure scenario controlling environmental exposure for ERC 6a

Further specification
Specific Environmental Release Categories [SPERC] SpERC ESVOC 6.1a.v1
Product characteristics
liquid.
Amounts used
Daily amount per site: 2 to
Annual amount per site: 40 to
Other given operational conditions affecting environmental exposure
Indoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 1.25%
Release fraction to wastewater from wide dispersive use: 0.09%
Release fraction to soil from process: 0.1%
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS.
Conditions and measures related to municipal sewage treatment plant
The minimum grade of elimination in the sewage plant is (%): 87,48
Size of industrial sewage treatment plant (m3/d): 2000

Number of the contributing scenario 2

Contributing exposure scenario controlling worker exposure for PROC 1

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario 3

Contributing exposure scenario controlling worker exposure for PROC 2

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 95 %).

Number of the contributing scenario 4

Contributing exposure scenario controlling worker exposure for PROC 3

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Effectiveness of LEV (local exhaust

ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario 5
Contributing exposure scenario controlling worker exposure for PROC 4

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Exposure estimation and reference to its source

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.011 mg/l; RCR: 0.517
Fresh Water (Sediment)	PEC: 0.089 mg/kg dw; RCR: 0.516
Marine Water (Pelagic)	PEC: 1.13E-3 mg/l; RCR: 0.517
Marine Water (Sediment)	PEC: 8.92E-3 mg/kg dw; RCR: 0.516
Agricultural Soil	PEC: 0.01 mg/kg dw; RCR: 0.475
Sewage Treatment Plant (Effluent)	PEC: 0.113 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 1	EE(inhal): 0.03
Proc 2	EE(inhal): 10.67
Proc 3	EE(inhal): 4.266
Proc 4	EE(inhal): 8.533

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio. Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.874
Proc 3	RCR(inhal): 0.35
Proc 4	RCR(inhal): 0.699

Number of the ES 2

Short title of the exposure scenario
Formulation & (re)packing of substances and mixtures

Sector of uses [SU]
SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

Process categories [PROC]
PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

Environmental release categories [ERC]
ERC2: Formulation of preparations (mixtures)

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by 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, maintenanance and associated laboratory activities.

Further explanations
Industrial use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System
Covers percentage substance in the product up to 100 % (unless stated differently).

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 2

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 2.2.v1 (ESVOC 4).
Product characteristics
liquid.
Amounts used
Daily amount per site: 0.5 to
Annual amount per site: 5 to
Other given operational conditions affecting environmental exposure
Indoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 2.5%
Release fraction to wastewater from process: 0.5%
Release fraction to soil from process: 0.01%
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS.
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87.48

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 1

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor and outdoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

Number of the contributing scenario **3**
Contributing exposure scenario controlling worker exposure for
PROC 2

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a basic standard of general ventilation (1 to 3 air changes per hour).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 95 %).

Number of the contributing scenario **4**
Contributing exposure scenario controlling worker exposure for
PROC 3

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **5**
Contributing exposure scenario controlling worker exposure for
PROC 4

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **6**
Contributing exposure scenario controlling worker exposure for
PROC 5

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) . Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Environment
PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 0.016 mg/l; RCR: 0.718
Fresh Water (Sediment)	PEC: 0.124 mg/kg dw; RCR: 0.717
Marine Water (Pelagic)	PEC: 1.56E-3 mg/l; RCR: 0.718
Marine Water (Sediment)	PEC: 0.012 mg/kg dw; RCR: 0.717
Agricultural Soil	PEC: 0.014 mg/kg dw; RCR: 0.656
Sewage Treatment Plant (Effluent)	PEC: 0.157 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects. EE(inhal): Estimated inhalative exposure [mg/m³].

Proc 1	EE(inhal): 0.122
Proc 2	EE(inhal): 10.67
Proc 3	EE(inhal): 4.266
Proc 4	EE(inhal): 8.533
Proc 5	EE(inhal): 9.142

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio. Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 1	RCR(inhal): < 0.01
Proc 2	RCR(inhal): 0.874
Proc 3	RCR(inhal): 0.35
Proc 4	RCR(inhal): 0.699
Proc 5	RCR(inhal): 0.749

Number of the ES 3

Short title of the exposure scenario

Distribution of substance

Sector of uses [SU]
SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

Process categories [PROC]
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Environmental release categories [ERC]
ERC2: Formulation of preparations (mixtures)

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by 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, maintenanance and associated laboratory activities.

Further explanations
Industrial use
Assessment tool used:

Chesar 3.3
Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes use at not more than 20°C above ambient temperature (unless stated differently)
Assumes an advanced standard of occupational Health and Safety Management System

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for
ERC 2

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 1.1b.v1 (ESVOC 3).
Product characteristics
liquid.
Amounts used
Daily amount per site: 4 to
Annual amount per site: 40 to
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from process: 0.1%
Release fraction to wastewater from process: 1E-3%
Release fraction to soil from process: 1E-3%
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS.
Conditions and measures related to municipal sewage treatment plant
Size of municipal sewage system/ treatment plant (m^3/d): 2000
The minimum grade of elimination in the sewage plant is (%): 87,48

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for
PROC 8a

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) . Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **3**
Contributing exposure scenario controlling worker exposure for
PROC 8b

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 95 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Number of the contributing scenario **4**
Contributing exposure scenario controlling worker exposure for
PROC 9

Product characteristics

Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of controlled ventilation (5 to 10 air changes per hour) . Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Environment

PEC = predicted environmental concentration (local); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.51E-4 mg/l; RCR: 0.012
Fresh Water (Sediment)	PEC: 1.99E-3 mg/kg dw; RCR: 0.011
Marine Water (Pelagic)	PEC: 2.51E-5 mg/l; RCR: 0.012
Marine Water (Sediment)	PEC: 1.99E-4 mg/kg dw; RCR: 0.011
Agricultural Soil	PEC: 2.33E-4 mg/kg dw; RCR: 0.011
Sewage Treatment Plant (Effluent)	PEC: 2.5E-3 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 8a	EE(inhal): 9.142
Proc 8b	EE(inhal): 6.399
Proc 9	EE(inhal): 7.314

Risk characterisation
RCR(inhal): inhalative risk characterisation ratio. Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values.

Proc 8a	RCR(inhal): 0.749
Proc 8b	RCR(inhal): 0.525
Proc 9	RCR(inhal): 0.6

Number of the ES 4

Short title of the exposure scenario

Use in laboratories

Process categories [PROC]
PROC15: Use as laboratory reagent

Environmental release categories [ERC]
ERC8a: Wide dispersive indoor use of processing aids in open systems

Product characteristics
Refer to attached safety data sheets

Processes and activities covered by the exposure scenario
Use of the substance within laboratory settings, including material transfers and equipment cleaning

Further explanations
Professional use
Assessment tool used:
Chesar 3.3
Assumes use at not more than 20°C above ambient temperature (unless stated differently)

Covers percentage substance in the product up to 100 % (unless stated differently)
Assumes a good basic standard of occupational hygiene is implemented

Number of the contributing scenario **1**
Contributing exposure scenario controlling environmental exposure for ERC 8a

Further specification
Specific Environmental Release Categories [SPERC], SpERC ESVOC 8.17.v1 (ESVOC 39).
Product characteristics
liquid.
Amounts used
daily wide dispersive use: 0.00000055 to/d
Other given operational conditions affecting environmental exposure
Indoor/Outdoor use
Technical conditions and measures at process level (source) to prevent release
Release fraction to air from wide dispersive use (regional only): 50%
Release fraction to wastewater from wide dispersive use: 50%
Release fraction to soil from process: 0%
Conditions and measures related to municipal sewage treatment plant
The minimum grade of elimination in the sewage plant is (%): 87.483

Number of the contributing scenario **2**
Contributing exposure scenario controlling worker exposure for PROC 15

Product characteristics
Liquid
Frequency and duration of use
8 h (full shift)
Other given operational conditions affecting workers exposure
Indoor use
Technical conditions and measures to control dispersion from source towards the worker
provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Effectiveness of LEV (local exhaust ventilation): 80 % (inhalative); 0 % (dermal).
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374. Wear respiratory protection (Efficiency: 90 %).

Environment

PEC = predicted environmental concentration (local+regional); RCR = risk characterisation ratio

Fresh Water (Pelagic)	PEC: 2.02E-6 mg/l; RCR: < 0.01
Fresh Water (Sediment)	PEC: 1.6E-5 mg/kg dw; RCR: < 0.01
Marine Water (Pelagic)	PEC: 2.02E-7 mg/l; RCR: < 0.01
Marine Water (Sediment)	PEC: 1.6E-6 mg/kg dw; RCR: < 0.01
Agricultural Soil	PEC: 1.62E-6 mg/kg dw; RCR: < 0.01
Sewage Treatment Plant (Effluent)	PEC: 1.72E-5 mg/l; RCR: < 0.01

Human exposure prediction (oral, dermal, inhalative)
Oral exposure is not expected to occur. EE(inhal): Estimated inhalative exposure [mg/m³]. Exposure estimates are given for short-term or long-term, systemic or local exposure depending on which lead to more conservative risk characterization ratios. The RMMs described above suffice to control risks for both local and systemic effects.

Proc 15	EE(inhal): 8.533

Risk characterisation
Where required local and systemic effects were evaluated both for short-term and long-term exposure. The RCR's given correspond in each case to the most conservative calculated values. RCR(inhal): inhalative risk characterisation ratio.

Proc 15	RCR(inhal): 0.699

Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Usage of relase factors allows downstream users to verify in a first approximation, if the combination of local usage and production conditions meets the defined release quantities resulting from this exposure scenario (calculated as M(site) [see amounts used, contributing scenario 1] x release factor [Technical conditions and measures at process level (source) to prevent release; contributing scenario 1])
For specific information regarding the SPERC used please refer to the ESIG webpage https://www.esig.org/reach-ges/environment/

associated uses:

Other combinations of operational conditions may also be safe. Please contact OXEA in case your local operational conditions differ from the ones described above and you are unsure if they are also safe