

SAFETY DATA SHEET



Tri-n-butylamine
10710

Version / Revision
Supersedes Version

5.01
5.00***

Revision Date
Issuing date

08-Feb-2022
08-Feb-2022

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

1.1. Product identifier

Identification of the
substance/preparation

Tri-n-butylamine

CAS-No
EC No.

102-82-9
203-058-7

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

Identified uses

Intermediate
Formulation
Distribution of substance
catalyst
coatings
laboratory chemicals

Uses advised against

None

1.3. Details of the supplier of the safety data sheet

Company/Undertaking
Identification

OQ Chemicals GmbH
Rheinpromenade 4A
D-40789 Monheim
Germany

Product Information

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

Acute oral toxicity Category 4, H302
Acute dermal toxicity Category 2, H310
Acute inhalation toxicity Category 1, H330
Skin corrosion/irritation Category 2, H315

Additional information

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

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2.2. Label elements

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

Hazard pictograms



Signal word

Danger

Hazard statements

H302: Harmful if swallowed.
H310: Fatal in contact with skin.
H330: Fatal if inhaled.
H315: Causes skin irritation.

Precautionary statements

P280: Wear protective gloves/protective clothing/eye protection/face protection.
P260: Do not breathe gas/mist/vapours.
P301 + P330: IF SWALLOWED: Rinse mouth
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.
P310: Immediately call a POISON CENTER/doctor.
P361: Take off immediately all contaminated clothing.
P403 + P233: Store in a well ventilated place. Keep container tightly closed.

2.3. Other hazards

Vapour/air-mixtures are explosive at intense warming

Components of the product may be absorbed into the body by inhalation, ingestion 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)

SECTION 3: Composition / information on ingredients

3.1. Substances

Component	CAS-No	1272/2008/EC	Concentration (%)
Tributylamine	102-82-9	Acute Tox. 4; H302 Acute Tox. 2; H310 Acute Tox. 1; H330 Skin Irrit. 2; H315	> 98,0

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

SECTION 4: First aid measures



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4.1. Description of first aid measures

Inhalation

Keep at rest. Breathe 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.

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 (NO_x)

Combustion gases of organic materials must in principle be graded as inhalation poisons

Vapour/air-mixtures are explosive at intense warming

Vapours are heavier than air and may spread along floors

5.3. Advice for firefighters

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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. 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. 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.

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Incompatible products

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/air-mixtures are explosive at intense warming.

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).

Unsuitable material

brass, copper, Aluminium, zinc, bronze

Temperature class

T3

7.3. Specific end use(s)

Intermediate

Formulation

Distribution of substance

catalyst

coatings

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

Tributylamine, CAS: 102-82-9

Workers

DN(M)EL - long-term exposure - systemic effects - Inhalation	5,3*** mg/m ³
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	10,6*** mg/m ³ ***
DN(M)EL - long-term exposure - local effects - Inhalation	15,2 mg/m ³

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DN(M)EL - acute / short-term exposure - local effects - Inhalation	15,2 mg/m ³
DN(M)EL - long-term exposure - systemic effects - Dermal	High hazard (no threshold derived) ^{***}
DN(M)EL - acute / short-term exposure - systemic effects - Dermal	High hazard (no threshold derived) ^{***}
DN(M)EL - long-term exposure - local effects - Dermal	Low hazard (no threshold derived) ^{***}
DN(M)EL - acute / short-term exposure - local effects - Dermal	Low hazard (no threshold derived) ^{***}
DN(M)EL - local effects - eyes	No hazard identified

General population

DN(M)EL - long-term exposure - systemic effects - Inhalation	Hazard unknown (no further information necessary)
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	Hazard unknown (no further information necessary)
DN(M)EL - long-term exposure - local effects - Inhalation	Hazard unknown (no further information necessary)
DN(M)EL - acute / short-term exposure - local effects - Inhalation	Hazard unknown (no further information necessary)
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	Hazard unknown (no further information necessary)
DN(M)EL - long-term exposure - local effects - Dermal	Hazard unknown (no further information necessary)
DN(M)EL - acute / short-term exposure - local effects - Dermal	Hazard unknown (no further information necessary)
DN(M)EL - long-term exposure - systemic effects - Oral	Hazard unknown (no further information necessary)
DN(M)EL - acute / short-term exposure - systemic effects - Oral	Hazard unknown (no further information necessary)
DN(M)EL - local effects - eyes	No hazard identified

Environment

PNEC aqua - freshwater	8 µg/l
PNEC aqua - marine water	0,8 µg/l
PNEC aqua - intermittent releases	80 µg/l
PNEC STP	100 mg/l
PNEC sediment - freshwater	35,85 mg/kg dw
PNEC sediment - marine water	3,59 mg/kg dw
PNEC Air	No hazard identified
PNEC soil	7,17 mg/kg dw
Secondary poisoning	No potential for bioaccumulation

8.2. Exposure controls

Special adaptations (REACH)

Not applicable.

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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	nitrile rubber
Evaluation	according to EN 374: level 6
Glove thickness	approx 0,55 mm
Break through time	> 480 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. 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

For specific exposure controls see the annex to this safety data sheet. 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 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

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Appearance	liquid
Colour	colourless
Odour	ammonia-like
Odour threshold	0,07 ppm
pH	10,2 (0,1 g/l in water @ 25 °C (77 °F)) DIN 19268
Melting point/range	< -90 °C (Pour point)
Method	DIN ISO 3016
Boiling point/range	208 °C @ 1013 hPa
Method	OECD 103
Flash point	75 °C @ 1013 hPa
Method	ISO 2719
Evaporation rate	No data available
Flammability (solid, gas)	Does not apply, the substance is a liquid
Lower explosion limit	0,6 Vol %
Upper explosion limit	11,5 Vol %

Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
0,18	0,018	< 0,001	20	68	OECD 104
2	0,2	< 0,001	53,8	128,8	OECD 104

Vapour density 6,4 (Air = 1) @ 20 °C (68 °F)

Relative density

Values	@ °C	@ °F	Method
0,777	20	68	DIN 51757

Solubility	0,08 g/l @ 20 °C, in water, OECD 105
log Pow	3,34 @ 25 °C (77 °F) OECD 123
Autoignition temperature	210 °C @ 1015 hPa
Method	DIN 51794
Decomposition temperature	No data available
Viscosity	1,393 mPa*s @ 20 °C
Method	DIN 51562, dynamic
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

9.2. Other information

Molecular weight	185,35
Molecular formula	C ₁₂ H ₂₇ N
log K_{oc}	4,65 @ 20°C (68 °F) calculated
Dissociation constant	pK _a 11 @ 20 °C (68 °F) OECD 112
Refractive index	1,429 @ 20 °C
Surface tension	55,7 mN/m (0,07 g/l @ 20°C (68°F)), OECD 115

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.

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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 (NO_x). cyanides. nitric acid. nitriles.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

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

Acute toxicity				
Tributylamine (102-82-9)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	420 mg/kg	rat, male	
Dermal	LD50	195 mg/kg	rabbit male	
Inhalative	LC50	0,5 mg/l (4h)	rat, male/female	OECD 403

Tributylamine, CAS: 102-82-9

Assessment

The available data lead to the classification given in section 2

Irritation and corrosion				
Tributylamine (102-82-9)				
Target Organ Effects	Species	Result	Method	
Eyes	rabbit	not irritating	OECD 405	72h
Skin	rabbit	irritating	OECD 404	4h
Respiratory tract	mouse	RD50: 96 ppm		

Tributylamine, CAS: 102-82-9

Assessment

The available data lead to the classification given in section 2

Sensitization				
Tributylamine (102-82-9)				
Target Organ Effects	Species	Evaluation	Method	

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Skin	guinea pig	not sensitizing	EPA OTS 798.4100	4 %, in Ethanol
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Tributylamine, CAS: 102-82-9

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

Tributylamine (102-82-9)

Type	Dose	Species	Method	
Subchronic toxicity***	NOAEL: 75 mg/kg/d (90d)***	rat, male/female***	OECD 408***	Oral***

Tributylamine, CAS: 102-82-9

Assessment

Based on available data, the classification criteria are not met for:

STOT RE

Carcinogenicity, Mutagenicity, Reproductive toxicity

Tributylamine (102-82-9)

Type	Dose	Species	Evaluation	Method	
Developmental Toxicity	NOAEL 45 mg/kg/d	rat		OECD 414, Oral	Maternal toxicity
Developmental Toxicity	NOAEL 135 mg/kg/d	rat		OECD 414, Oral	Teratogenicity
Developmental Toxicity	NOAEL 135 mg/kg/d	rat		OECD 414, Oral	Fetal toxicity
Mutagenicity		mouse	negative	OECD 474	in vivo
Mutagenicity		Salmonella typhimurium	negative	OECD 471 (Ames)	In vitro study
Mutagenicity		mouse lymphoma cells	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Reproductive toxicity	LOAEL: 50 mg/kg/d (90 d)	rat, male/female		OECD 413	read across
Reproductive toxicity	LOAEL 50 - 200 mg/kg/d	rat, parental		OECD 421	read across
Reproductive toxicity	NOAEL 200 mg/kg/d	rat, 1. Generation, male/female		OECD 421	read across
Mutagenicity		Salmonella typhimurium	positive (without metabolic activation)	OECD 471 (Ames)	In vitro study

Tributylamine, CAS: 102-82-9

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

Did not show mutagenic effects in animal experiments

In the absence of specific alerts no cancer testing is required

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Tributylamine, CAS: 102-82-9

Main symptoms

shortness of breath, convulsions, cough, hypertensive effect.

Aspiration toxicity

no data available

Other adverse effects

Components of the product may be absorbed into the body by inhalation, ingestion 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			
Tributylamine (102-82-9)			
Species	Exposure time	Dose	Method
Daphnia magna (Water flea)	48h	EC50: 8 mg/l	OECD 202
Pseudokirchneriella subcapitata	72h	EC50: 10,1 mg/l	OECD 201
Danio rerio (Zebra fish)	28 d	LC50: > 10 mg/l	OECD 204
Oryzias latipes (Medaka)	96h	LC50: 16,3 mg/l	OECD 203
Activated sludge (domestic)	7 d	EC5 : 100 mg/l	read across
Bacteria / Sewage	2 h	NOEC: 100 mg/l	

Long term toxicity				
Tributylamine (102-82-9)				
Type	Species	Dose	Method	
Aquatic toxicity	Pseudokirchneriella subcapitata	NOEC: 1,65 mg/l (3d)	OECD 201	

Terrestrial toxicity				
Tributylamine (102-82-9)				
Species	Exposure time	Dose	Type	Method
Lucilia Sericata (Fleshfly)	4 - 5 d	LC100: 1250 mg/kg		Oral

12.2. Persistence and degradability

Tributylamine, CAS: 102-82-9

Biodegradation

88 % (28*** d), aerobic, activated sludge, domestic, non-adapted, OECD 301 B.

Abiotic Degradation		
Tributylamine (102-82-9)		
Type	Result	Method
Photolysis	Half-life (DT50): 3,624 h	calculated SRC AOP v1.92
Hydrolysis	not expected	

12.3. Bioaccumulative potential

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Tributylamine (102-82-9)		
Type	Result	Method
log Pow	3,34 @ 25 °C (77 °F)	OECD 123
BCF	7,3	OECD 305***

12.4. Mobility in soil

Tributylamine (102-82-9)		
Type	Result	Method
Surface tension	55,7 mN/m (0,07 g/l @ 20°C (68°F))	OECD 115
Adsorption/Desorption	log koc: 4,65 @ 20 °C (68 °F)	calculated
Distribution to environmental compartments	Air: 0,7 % Soil: 74,6 % Water: 23,7 % Sediment: 1 %	Fugacity Model Level III

12.5. Results of PBT and vPvB assessment

Tributylamine, CAS: 102-82-9

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. Other adverse effects

Tributylamine, CAS: 102-82-9

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

ADR/RID

14.1. UN number

UN 2542

14.2. UN proper shipping name

Tributylamine

14.3. Transport hazard class(es)

6.1

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14.4. Packing group II
14.5. Environmental hazards no
14.6. Special precautions for user
ADR Tunnel restriction code (D/E)
Classification Code T1
Hazard Number 60

ADN

ADN Container

14.1. UN number UN 2542
14.2. UN proper shipping name Tributylamine
14.3. Transport hazard class(es) 6.1
14.4. Packing group II
14.5. Environmental hazards no
14.6. Special precautions for user
Classification Code T1
Hazard Number 60

ADN

ADN Tanker
forbidden

ICAO-TI / IATA-DGR

14.1. UN number UN 2542
14.2. UN proper shipping name Tributylamine
14.3. Transport hazard class(es) 6.1
14.4. Packing group II
14.5. Environmental hazards no
14.6. Special precautions for user no data available

IMDG

14.1. UN number UN 2542
14.2. UN proper shipping name Tributylamine
14.3. Transport hazard class(es) 6.1
14.4. Packing group II
14.5. Environmental hazards no
14.6. Special precautions for user
EmS F-A, S-A
14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code not applicable

SECTION 15: Regulatory information

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

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Regulation 1272/2008, Annex VI

not listed

DI 2012/18/EU (Seveso III)

Category

Annex I, part 1:
H1

DI 1999/13/EC (VOC Guideline)

Component	Status
Tributylamine CAS: 102-82-9	regulated

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

Component	Status
Tributylamine CAS: 102-82-9	The substance will not be pre-registered

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

International Inventories

Tributylamine, CAS: 102-82-9

AICS (AU)
DSL (CA)
IECSC (CN)
EC-No. 2030587 (EU)
ENCS (2)-142 (JP)
ISHL (2)-142 (JP)
KECI 98-1-480 (KR)
KECI KE-09973 (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



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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

H302: Harmful if swallowed.
H310: Fatal in contact with skin.
H330: Fatal if inhaled.
H315: Causes skin 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 OQ 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 OQ homepage (www.chemicals.oq.com).

Disclaimer

For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. OQ makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards.

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
Long-term Systemic effects via inhalation
Acute systemic hazards via inhalation
Long term local hazards via inhalation
Acute local hazards via inhalation
Long-term Systemic effects via skin
Acute systemic hazards via skin
Long-term local effects via skin
Acute local hazards via skin***

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Operational conditions and risk management measures

Following operational conditions and risk management measures, are based on qualitative risk characterisation:

Any measure to eliminate exposure should be considered

Containment of source except for short term exposure (e.g. taking sample)

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 general ventilation

Recording of any 'near miss' situations

Substance/task appropriate gloves

Substance/Task appropriate respirator, based on potential exposure to the use

Full skin coverage with appropriate light-weight barrier material

Chemical goggles or safety glasses

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 Catalyst Use
- 5 Uses in coatings
- 6 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)

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,

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material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

Further explanations

Industrial use

Assessment tool used:

Chesar 3.5

liquid

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

Amounts used

Daily amount per site: 22,5 to

Annual amount per site: 450 to

Fraction of Regional tonnage used locally: 1

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: 5E-3%

Release fraction to wastewater from process: 9E-3%

Release fraction to soil from process: 0.1%

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Onsite treatment wastewater. Apply acclimated biological treatment. Assumed Efficiency: 70 % Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS. Onsite treatment off-air. Upgrade Systems in place or implement additional treatment. Assumed Efficiency: 50 %

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/ treatment plant (m³/d): 2000

Water flow in sewage/river (m³/day): 18000

The minimum grade of elimination in the sewage plant is (%): 93.3

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

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

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) .

Conditions and measures related to personal protection, hygiene and health evaluation

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Wear suitable gloves tested to EN374.

Number of the contributing scenario

4

Contributing exposure scenario controlling worker exposure for PROC 3

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). 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.

Exposure estimation and reference to its source

Environment

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

Fresh Water (Pelagic)	PEC: 6.35E-3 mg/l; RCR: 0.794
Fresh Water (Sediment)	PEC: 28.46 mg/kg dw; RCR: 0.794
Marine Water (Pelagic)	PEC: 6.35E-4 mg/l; RCR: 0.794
Marine Water (Sediment)	PEC: 2.847 mg/kg dw; RCR: 0.793
Agricultural Soil	PEC: 4.663 mg/kg dw; RCR: 0.65
Sewage Treatment Plant (Effluent)	PEC: 0.068 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): 0.309
Proc 2	EE(inhal): 9.267
Proc 3	EE(inhal): 9.267

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). 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): 0.029
Proc 2	RCR(inhal): 0.874
Proc 3	RCR(inhal): 0,874

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)

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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)

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, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

Further explanations

Industrial use

Assessment tool used:

Chesar 3.5

liquid

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 2

Further specification

Specific Environmental Release Categories [SPERC], SpERC ESVOC 2.2.v1 (ESVOC 4).

Amounts used

Daily amount per site: 4 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: 0.5%

Release fraction to wastewater from process: 0.02%

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 (m³/d): 2000

The minimum grade of elimination in the sewage plant is (%): 93,3

Number of the contributing scenario

2

Contributing exposure scenario controlling worker exposure for PROC 1

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 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.

Number of the contributing scenario

3

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Contributing exposure scenario controlling worker exposure for PROC 2

Frequency and duration of use

8 h (full shift)

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) .

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

Number of the contributing scenario 4

Contributing exposure scenario controlling worker exposure for PROC 3

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). 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.

Number of the contributing scenario 5

Contributing exposure scenario controlling worker exposure for PROC 4

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.

Number of the contributing scenario 6

Contributing exposure scenario controlling worker exposure for PROC 5

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.

Environment

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

Fresh Water (Pelagic)	PEC: 2.51E-3 mg/l; RCR: 0.314
Fresh Water (Sediment)	PEC: 11.25 mg/kg dw; RCR: 0.314
Marine Water (Pelagic)	PEC: 2.51E-4 mg/l; RCR: 0.314
Marine Water (Sediment)	PEC: 1.125 mg/kg dw; RCR: 0.313
Agricultural Soil	PEC: 1.843 mg/kg dw; RCR: 0.257
Sewage Treatment Plant (Effluent)	PEC: 0.027 mg/l; RCR: 0.01

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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): 0.216
Proc 2	EE(inhal): 9.267
Proc 3	EE(inhal): 9.267
Proc 4	EE(inhal): 4.634
Proc 5	EE(inhal): 4.634

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). 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): 0.02
Proc 2	RCR(inhal): 0.874
Proc 3	RCR(inhal): 0.874
Proc 4	RCR(inhal): 0.437
Proc 5	RCR(inhal): 0.437

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, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

Further explanations

Industrial use

Assessment tool used:

Chesar 3.5

liquid

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***

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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).

Amounts used

Daily amount per site: 5 to

Annual amount per site: 500 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: 0.01%

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 (m³/d): 2000

The minimum grade of elimination in the sewage plant is (%): 93.3

Other given operational conditions affecting workers exposure

Indoor use

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

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.

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

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). 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.

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

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).***

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Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

Environment

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

Fresh Water (Pelagic)	PEC: 1.57E-4 mg/l; RCR: 0.02
Fresh Water (Sediment)	PEC: 0.703 mg/kg dw; RCR: 0.02
Marine Water (Pelagic)	PEC: 1.57E-5 mg/l; RCR: 0.02
Marine Water (Sediment)	PEC: 0.07 mg/kg dw; RCR: 0.02
Agricultural Soil	PEC: 0.115 mg/kg dw; RCR: 0.016
Sewage Treatment Plant (Effluent)	PEC: 1.67E-3 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 8a	EE(inhal): 9.267
Proc 8b	EE(inhal): 7.723
Proc 9	EE(inhal): 4.634

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). 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): 0.874
Proc 8b	RCR(inhal): 0.729
Proc 9	RCR(inhal): 0.437

Number of the ES 4

Short title of the exposure scenario

Catalyst Use

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]

ERC6b: Industrial use of reactive processing aids

Product characteristics

Refer to attached safety data sheets

Further explanations

Industrial use
Assessment tool used:
Chesar 3.5
liquid

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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 6b

Further specification

release factors for (Sp)ERC were modified.

Amounts used

Daily amount per site: 0.05 to

Annual amount per site: 1 to

Fraction of Regional tonnage used locally: 1

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: 2%

Release fraction to soil from process: 0.025%

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/ treatment plant (m³/d): 2000

Water flow in sewage/river (m³/day): 18000

The minimum grade of elimination in the sewage plant is (%): 93.3

Number of the contributing scenario

2

Contributing exposure scenario controlling worker exposure for PROC 1

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

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) .

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

Number of the contributing scenario

4

Contributing exposure scenario controlling worker exposure for PROC 3

Frequency and duration of use

8 h (full shift)

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). 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.

Number of the contributing scenario

5

Contributing exposure scenario controlling worker exposure for PROC 4

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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.

Environment

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

Fresh Water (Pelagic)	PEC: 3.14E-3 mg/l; RCR: 0.392
Fresh Water (Sediment)	PEC: 14.05 mg/kg dw; RCR: 0.392
Marine Water (Pelagic)	PEC: 3.14E-4 mg/l; RCR: 0.392
Marine Water (Sediment)	PEC: 1.406 mg/kg dw; RCR: 0.392
Agricultural Soil	PEC: 2.303 mg/kg dw; RCR: 0.321
Sewage Treatment Plant (Effluent)	PEC: 0.033 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): 0.309
Proc 2	EE(inhal): 9.267
Proc 3	EE(inhal): 9.267
Proc 4	EE(inhal): 4.634

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). 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): 0.029
Proc 2	RCR(inhal): 0.874
Proc 3	RCR(inhal): 0.874
Proc 4	RCR(inhal): 0.437

Number of the ES 5

Short title of the exposure scenario

Uses in coatings

Sector of uses [SU]

SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process categories [PROC]

PROC7: Industrial spraying

PROC10: Roller application or brushing

PROC13: Treatment of articles by dipping and pouring

Environmental release categories [ERC]

ERC5: Industrial use resulting in inclusion into or onto a matrix

Product characteristics

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Refer to attached safety data sheets

Processes and activities covered by the exposure scenario

Covers the use in coatings (paints, inks, adhesives, etc) within closed or contained systems including incidental exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application activities and film formation) and equipment cleaning, maintenance and associated laboratory activities.

Further explanations

Industrial use

Assessment tool used:

Chesar 3.5

liquid

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 5

Further specification

Specific Environmental Release Categories [SPERC], CEPE SPERC 5.2a.v1.

Amounts used

Daily amount per site: 0.35 to

Annual amount per site: 7 to

Fraction of Regional tonnage used locally: 1

Frequency and duration of use

Covers use up to: 20 days

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: 0.04%

Release fraction to wastewater from process: 0%

Release fraction to soil from process: 0%

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Onsite treatment off-air. Apply incineration / oxidation. Assumed Efficiency: 98 %

Conditions and measures related to municipal sewage treatment plant

Size of municipal sewage system/ treatment plant (m³/d): 2000

Water flow in sewage/river (m³/day): 18000

The minimum grade of elimination in the sewage plant is (%): 93.3

Number of the contributing scenario

2

Contributing exposure scenario controlling worker exposure for PROC 7

Frequency and duration of use

8 h (full shift)

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): 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

3

Contributing exposure scenario controlling worker exposure for PROC 10

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

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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.

Number of the contributing scenario

4

Contributing exposure scenario controlling worker exposure for PROC 13

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.

Environment

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

Fresh Water (Pelagic)	PEC: 1.19E-7 mg/l; RCR: 0.01
Fresh Water (Sediment)	PEC: 5.35E-4 mg/kg dw; RCR: 0.01
Marine Water (Pelagic)	PEC: 1.04E-8 mg/l; RCR: 0.01
Marine Water (Sediment)	PEC: 4.64E-5 mg/kg dw; RCR: 0.01
Agricultural Soil	PEC: 4.57E-6 mg/kg dw; RCR: 0.01
Sewage Treatment Plant (Effluent)	PEC: 0 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 7	EE(inhal): 4.634
Proc 10	EE(inhal): 9.267
Proc 13	EE(inhal): 9.267

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). 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 7	RCR(inhal): 0.437
Proc 10	RCR(inhal): 0.874
Proc 13	RCR(inhal): 0.874

Number of the ES **6**

Short title of the exposure scenario

Use in laboratories

Sector of uses [SU]

SU22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories [PROC]

PROC15: Use as laboratory reagent

Environmental release categories [ERC]

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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 small quantities within laboratory settings, including material transfers and equipment cleaning

Further explanations

Professional use

Assessment tool used:

Chesar 3.5

liquid

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 basic standard of occupational Health and Safety Management System***

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).

Amounts used

daily wide dispersive use: 5.5E-7 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 wastewater from wide dispersive use: 50%

Release fraction to air from wide dispersive use (regional only): 50%

Release fraction to soil from wide dispersive use (regional only): %

Conditions and measures related to municipal sewage treatment plant

The minimum grade of elimination in the sewage plant is (%): 93.33

Number of the contributing scenario

2

Contributing exposure scenario controlling worker exposure for PROC 15

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: 9.82E-7 mg/l; RCR: 0.01
Fresh Water (Sediment)	PEC: 4.4E-3 mg/kg dw; RCR: 0.01
Marine Water (Pelagic)	PEC: 9.66E-8 mg/l; RCR: 0.01
Marine Water (Sediment)	PEC: 4.33E-4 mg/kg dw; RCR: 0.01
Agricultural Soil	PEC: 6.33E-4 mg/kg dw; RCR: 0.01
Sewage Treatment Plant (Effluent)	PEC: 9.21E-6 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].

SAFETY DATA SHEET



Tri-n-butylamine
10710

Version / Revision 5.01

Proc 15

EE(inhal): 2.162

Risk characterisation

RCR(inhal): inhalative risk characterisation ratio; RCR(derm): dermal risk characterisation ratio; total RCR= RCR(inhal) +RCR(derm). 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 15

RCR(inhal): 0.204

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

Usage of release 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 $M(\text{site})$ [see amounts used, contributing scenario 1] x release factor [Technical conditions and measures at process level (source) to prevent release; contributing scenario 1])

associated uses:

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