

# SAFETY DATA SHEET



Di-n-butylamine

10220

Version / Revision

4

Revision Date

30-Apr-2020

Supersedes Version

3.00

Issuing date

15-May-2020

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

### 1.1. Product identifier

Identification of the substance/preparation

**Di-n-butylamine**

CAS-No

111-92-2

EC No.

203-921-8

Registration number (REACH)

01-2119475606-30

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

Identified uses

Intermediate  
Formulation  
laboratory chemicals  
Rubber production and processing

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)

Flammable liquid Category 3, H226  
Acute oral toxicity Category 4, H302  
Acute dermal toxicity Category 3, H311  
Acute inhalation toxicity Category 2, H330  
Skin corrosion/irritation Category 1A, H314  
Serious eye damage/eye irritation Category 1, H318

Additional information

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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

H226: Flammable liquid and vapour.  
H302: Harmful if swallowed.  
H311: Toxic in contact with skin.  
H330: Fatal if inhaled.  
H314: Causes severe skin burns and eye damage.

### 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.  
P284: Wear respiratory protection.  
P301 + P330 + P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  
P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.  
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.  
P501: Dispose of contents/container in accordance with local regulation.

## 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	REACH-No	1272/2008/EC	Concentration (%)
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Dibutylamine	111-92-2	01-2119475606-30	Flam. Liq. 3; H226 Acute Tox. 4; H302 Acute Tox. 3; H311 Acute Tox. 2; H330 Skin Corr. 1A; H314 Eye Dam. 1; H318	> 99,5
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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. 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, allergic reactions, vomiting, unconsciousness, nausea, abdominal pain, circulatory collapse.

#### Special hazard

Stomach perforation, Lung oedema, Kidney disorders.

### 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 (CO<sub>2</sub>), water spray

#### Unsuitable Extinguishing Media

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

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## 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 (CO<sub>2</sub>)

nitrogen oxides (NO<sub>x</sub>)

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

Vapours are heavier than air and may spread along floors

Vapour/air-mixtures are explosive at intense warming

## 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

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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**

acids  
acid anhydrides  
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**

copper, Tin, Aluminium, including their alloys

### **Temperature class**

T3

## **7.3. Specific end use(s)**

Intermediate

Formulation

laboratory chemicals

Rubber production and processing

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**

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No exposure limits established.

## DNEL & PNEC

### Dibutylamine, CAS: 111-92-2

#### Workers

DN(M)EL - long-term exposure - systemic effects - Inhalation	29 mg/m <sup>3</sup>
DN(M)EL - acute / short-term exposure - systemic effects - Inhalation	29 mg/m <sup>3</sup>
DN(M)EL - long-term exposure - local effects - Inhalation	29 mg/m <sup>3</sup>
DN(M)EL - acute / short-term exposure - local effects - Inhalation	29 mg/m <sup>3</sup>

#### Environment

PNEC aqua - freshwater	0,084 mg/l
PNEC aqua - marine water	0,0084 mg/l
PNEC aqua - intermittent releases	0,084 mg/l
PNEC STP	149,5 mg/l
PNEC sediment - freshwater	11,4 mg/kg
PNEC sediment - marine water	1,14 mg/kg
PNEC Air	No hazard identified
PNEC soil	2,23 mg/kg
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

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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. 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>.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

<b>Appearance</b>	liquid
<b>Colour</b>	colourless
<b>Odour</b>	ammonia-like
<b>Odour threshold</b>	No data available
<b>pH</b>	11,3 (1 g/l in water @ 20 °C (68 °F))
<b>Melting point/range</b>	-57 °C (Pour point)
<b>Boiling point/range</b>	160 °C @ 1013 hPa
<b>Flash point</b>	40,5 °C
<b>Method</b>	DIN 51755
<b>Evaporation rate</b>	No data available
<b>Flammability (solid, gas)</b>	Does not apply, the substance is a liquid
<b>Lower explosion limit</b>	1,1 Vol %
<b>Upper explosion limit</b>	6,8 Vol %

#### Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
2,2	0,22	0,002	20	68	
26	2,6	0,026	50	122	

**Vapour density** 4,5 (Air = 1) @ 20 °C (68 °F)

#### Relative density

Values	@ °C	@ °F	Method
0,759	20	68	DIN 51757

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<b>Solubility</b>	3,8 g/l @ 20 °C, in water
<b>log Pow</b>	2.9 (measured), OECD 117
<b>Autoignition temperature</b>	255 °C
<b>Method</b>	DIN 51794
<b>Decomposition temperature</b>	No data available
<b>Viscosity</b>	0,85 mPa*s @ 20 °C
<b>Method</b>	dynamic
<b>Explosive properties</b>	Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties
<b>Oxidizing properties</b>	Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties

## 9.2. Other information

<b>Molecular weight</b>	129,24
<b>Molecular formula</b>	C8 H19 N
<b>Refractive index</b>	1,417 @ 20 °C

## 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

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 toxicological effects

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

#### Acute toxicity



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<b>Dibutylamine (111-92-2)</b>				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	550 mg/kg	rat, male	
Dermal	LD50	768 mg/kg	rabbit	Draize Test
Inhalative	LC50	1,15 mg/l (4h)	rat, male/female	OECD 403

## **Dibutylamine, CAS: 111-92-2**

### **Assessment**

The available data lead to the classification given in section 2

<b>Irritation and corrosion</b>				
<b>Dibutylamine (111-92-2)</b>				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	corrosive	OECD 404	< 3 min
Eyes	rabbit	corrosive	OECD 405	

## **Dibutylamine, CAS: 111-92-2**

### **Assessment**

The available data lead to the classification given in section 2

For respiratory irritation, no data are available

<b>Sensitization</b>				
<b>Dibutylamine (111-92-2)</b>				
Target Organ Effects	Species	Evaluation	Method	
Skin	guinea pig	not sensitizing	EPA OTS 798.4100	

## **Dibutylamine, CAS: 111-92-2**

### **Assessment**

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

Skin sensitization

For respiratory sensitization, no data are available

<b>Subacute, subchronic and prolonged toxicity</b>				
<b>Dibutylamine (111-92-2)</b>				
Type	Dose	Species	Method	
Subchronic toxicity	NOAEC: 50 mg/m <sup>3</sup> (90 d)	rat, male	OECD 413	Inhalation

## **Dibutylamine, CAS: 111-92-2**

### **Assessment**

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

STOT RE

<b>Carcinogenicity, Mutagenicity, Reproductive toxicity</b>					
<b>Dibutylamine (111-92-2)</b>					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		Salmonella typhimurium	negative	Ames test	In vitro study
Mutagenicity		mouse	negative	OECD 475	Bone marrow
Mutagenicity		mouse lymphoma cells	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Mutagenicity		CHL	ambiguous	OECD 473	In vitro study

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				(Chromosomal Aberration)	
Reproductive toxicity	NOAEL 40 mg/kg/d	rat, parental		OECD 422, Oral	read across
Developmental Toxicity	NOAEL 15 mg/kg/d	rat	Maternal toxicity	OECD 414, Oral	read across
Developmental Toxicity	NOAEL 150 mg/kg/d	rat	Developmental toxicity	OECD 414, Oral	read across

## **Dibutylamine, CAS: 111-92-2**

### **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

## **Dibutylamine, CAS: 111-92-2**

### **Main symptoms**

shortness of breath, convulsions, cough, hypertensive effect, allergic reactions, vomiting, unconsciousness, nausea, abdominal pain, circulatory collapse.

### **Target Organ Systemic Toxicant - Single exposure**

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

STOT SE

### **Target Organ Systemic Toxicant - Repeated exposure**

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

STOT RE

### **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**

<b>Acute aquatic toxicity</b>			
<b>Dibutylamine (111-92-2)</b>			
Species	Exposure time	Dose	Method
Oncorhynchus mykiss (rainbow trout)	96h	LC50: 5,5 mg/l (soft water)	IRSA
Oncorhynchus mykiss (rainbow trout)	96h	LC50: 37 mg/l (hard water)	IRSA
Daphnia magna (Water flea)	48h	EC50: 65,98 mg/l	79/831/EEC.C2
Ceriodaphnia dubia	48h	LC50: 8,4 mg/l	
Desmodesmus subspicatus	72h	EC50: 16,91 mg/l (Growth rate)	DIN 38412, part 9
Desmodesmus subspicatus	72h	EC50: 9,43 mg/l (Biomass)	DIN 38412, part 9
Pseudomonas putida	17 h	EC50: 195,8 mg/l (Growth)	DIN 38412, part 8

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		inhibition)	
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## Long term toxicity

### Dibutylamine (111-92-2)

Type	Species	Dose	Method	
Reproductive toxicity	Daphnia magna (Water flea)	NOEC: 4,2 mg/l (21d)	OECD 211	read across
Reproductive toxicity	Daphnia magna (Water flea)	LC50: 5,7 mg/l/21d	OECD 211	read across

## 12.2. Persistence and degradability

### Dibutylamine, CAS: 111-92-2

#### Biodegradation

95 % (28 d), Sewage, aerobic, OECD 301 C.

#### Abiotic Degradation

### Dibutylamine (111-92-2)

Type	Result	Method
Photolysis	Half-life (DT50): 4,29 h	calculated
Hydrolysis	not expected	

## 12.3. Bioaccumulative potential

### Dibutylamine (111-92-2)

Type	Result	Method
log Pow	2,9	OECD 117
BCF	0,768	calculated

## 12.4. Mobility in soil

### Dibutylamine (111-92-2)

Type	Result	Method
Surface tension	50,6 mN/m (1,0048 g/l @ 20°C (68°F))	OECD 115
Adsorption/Desorption	log Koc: 3,12 @ pH 5-8	calculated
Distribution to environmental compartments	Air: 72,6 Soil: 0,2 Water: 26,5 Sediment: 0,3	calculated

## 12.5. Results of PBT and vPvB assessment

### Dibutylamine, CAS: 111-92-2

#### 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

### Dibutylamine, CAS: 111-92-2

No data available

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## 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

<b>14.1. UN number</b>	UN 2248
<b>14.2. UN proper shipping name</b>	Di-n-butylamine
<b>14.3. Transport hazard class(es)</b>	8
Subsidiary Risk	3
<b>14.4. Packing group</b>	II
<b>14.5. Environmental hazards</b>	no
<b>14.6. Special precautions for user</b>	
ADR Tunnel restriction code	(D/E)
Classification Code	CF1
Hazard Number	83

### ADN

ADN Container

<b>14.1. UN number</b>	UN 2248
<b>14.2. UN proper shipping name</b>	Di-n-butylamine
<b>14.3. Transport hazard class(es)</b>	8
Subsidiary Risk	3
<b>14.4. Packing group</b>	II
<b>14.5. Environmental hazards</b>	no
<b>14.6. Special precautions for user</b>	
Classification Code	CF1
Hazard Number	83

### ICAO-TI / IATA-DGR

<b>14.1. UN number</b>	UN 2248
<b>14.2. UN proper shipping name</b>	Di-n-butylamine
<b>14.3. Transport hazard class(es)</b>	8
Subsidiary Risk	3

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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 2248  
14.2. UN proper shipping name Di-n-butylamine  
14.3. Transport hazard class(es) 8  
Subsidiary Risk 3  
14.4. Packing group II  
14.5. Environmental hazards no  
14.6. Special precautions for user  
EmS F-E, S-C  
14.7. Transport in bulk according to Annex  
II of MARPOL and the IBC Code  
Product name Dibutylamine  
Ship type 3  
Pollution category Y

## SECTION 15: Regulatory information

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

#### Regulation 1272/2008, Annex VI

##### Dibutylamine, CAS: 111-92-2

**Classification** Flam. Liq. 3; H226  
Acute Tox. 4\*; H332  
Acute Tox. 4\*; H312  
Acute Tox. 4\*; H302

**Hazard pictograms** GHS02 Flame  
GHS07 Exclamation mark

**Signal word** Warning

**Hazard statements** H226, H332, H312, H302

##### DI 2012/18/EU (Seveso III)

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

##### DI 1999/13/EC (VOC Guideline)

Component	Status
Dibutylamine CAS: 111-92-2	regulated

## International Inventories

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## **Dibutylamine, CAS: 111-92-2**

AICS (AU)  
DSL (CA)  
IECSC (CN)  
EC-No. 2039218 (EU)  
ENCS (2)-137 (JP)  
ISHL (2)-137 (JP)  
KECI 97-1-21 (KR)  
KECI KE-04223 (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**

H226: Flammable liquid and vapour.  
H302: Harmful if swallowed.  
H311: Toxic in contact with skin.  
H314: Causes severe skin burns and eye damage.  
H318: Causes serious eye damage.  
H330: Fatal if inhaled.

### **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](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



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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](http://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

Acute Health Hazard:

Qualitative approach used to conclude safe use.

Risks resulting from short-term exposure are covered by the long-term exposure assessment

### Operational conditions and risk management measures

Wear suitable gloves tested to EN 374 for activities, where direct contact with substance is possible. Wear suitable eye protection, where direct contact (e.g. splashes) with substance is possible.

### Exposure scenario identification

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

### 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)

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PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises  
PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities  
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities  
PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

## 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 (including marine vessel/barge, road/rail car and bulk container).

## Further explanations

Industrial use

<b>Number of the contributing scenario</b>	<b>1</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 1</b>	

### Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to palm of 1 hand (240 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor and outdoor use

### Technical conditions and measures to control dispersion from source towards the worker

Without local exhaust ventilation.

<b>Number of the contributing scenario</b>	<b>2</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 2</b>	

### Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to palm of 2 hands (480 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

<b>Number of the contributing scenario</b>	<b>3</b>
<b>Contributing exposure scenario controlling worker exposure for PROC 3</b>	

### Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)



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## Frequency and duration of use

8 h (full shift)

## Human factors not influenced by risk management

corresponds to palm of 1 hand (240 cm<sup>2</sup>)

## Other given operational conditions affecting workers exposure

Indoor use

## Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

## Number of the contributing scenario

4

## Contributing exposure scenario controlling worker exposure for PROC 4

## Further specification

Ecetoc TRA V2 modified

## Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

## Frequency and duration of use

8 h (full shift)

## Human factors not influenced by risk management

corresponds to palm of 2 hands (480 cm<sup>2</sup>)

## Other given operational conditions affecting workers exposure

Indoor use

## Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

## Number of the contributing scenario

5

## Contributing exposure scenario controlling worker exposure for PROC 8a

## Further specification

Ecetoc TRA V2 modified

## Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

## Frequency and duration of use

8 h (full shift)

## Human factors not influenced by risk management

corresponds to 2 hands (960 cm<sup>2</sup>)

## Other given operational conditions affecting workers exposure

Indoor use

## Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

## Number of the contributing scenario

6

## Contributing exposure scenario controlling worker exposure for PROC 8b

## Further specification

Ecetoc TRA V2 modified

## Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

## Frequency and duration of use

8 h (full shift)

## Human factors not influenced by risk management

corresponds to palm of 2 hands (480 cm<sup>2</sup>)

## Other given operational conditions affecting workers exposure

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Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

Effectiveness of LEV (local exhaust ventilation): 97 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

**Number of the contributing scenario**

7

**Contributing exposure scenario controlling worker exposure for PROC 9**

**Further specification**

Ecetoc TRA V2 modified

**Product characteristics**

Covers percentage substance in the product up to 100 % (unless stated differently)

**Frequency and duration of use**

8 h (full shift)

**Human factors not influenced by risk management**

corresponds to palm of 1 hand (240 cm<sup>2</sup>)

**Other given operational conditions affecting workers exposure**

Indoor use

**Technical conditions and measures to control dispersion from source towards the worker**

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

## Exposure estimation and reference to its source

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative short-term exposure [mg/m<sup>3</sup>]; EE(derm): Estimated dermal short-term exposure [mg/kg b.w./d]. 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): 0.108
Proc 2	EE(inhal): 1.077
Proc 3	EE(inhal): 3.230
Proc 4	EE(inhal): 5.383
Proc 8a	EE(inhal): 10.767
Proc 8b	EE(inhal): 1.615
Proc 9	EE(inhal): 5.383

### 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): 0.004
Proc 2	RCR(inhal): 0.037
Proc 3	RCR(inhal): 0.111
Proc 4	RCR(inhal): 0.186
Proc 8a	RCR(inhal): 0.373
Proc 8b	RCR(inhal): 0.056
Proc 9	RCR(inhal): 0.186

### 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

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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

## 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]

PROC3: Use in closed batch process (synthesis or formulation)

PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)

PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities

PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities

PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

#### 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

#### Number of the contributing scenario

1

#### Contributing exposure scenario controlling worker exposure for PROC 3

#### Further specification

Ecetoc TRA V2 modified

#### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

#### Frequency and duration of use

8 h (full shift)

#### Human factors not influenced by risk management

corresponds to palm of 1 hand (240 cm<sup>2</sup>)

#### Other given operational conditions affecting workers exposure

Indoor use

#### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

#### Number of the contributing scenario

2

#### Contributing exposure scenario controlling worker exposure for PROC 5

#### Further specification

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## Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to palm of 2 hands (480 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

**Number of the contributing scenario** 3

**Contributing exposure scenario controlling worker exposure for PROC 8a**

## Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to 2 hands (960 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

**Number of the contributing scenario** 4

**Contributing exposure scenario controlling worker exposure for PROC 8b**

## Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to palm of 2 hands (480 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 97 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

**Number of the contributing scenario** 5

**Contributing exposure scenario controlling worker exposure for PROC 9**

## Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

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corresponds to palm of 2 hands (480 cm<sup>2</sup>)

#### Other given operational conditions affecting workers exposure

Indoor use

#### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

#### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative short-term exposure [mg/m<sup>3</sup>]; EE(derm): Estimated dermal short-term exposure [mg/kg b.w./d]. 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 3	EE(inhal): 3.230
Proc 5	EE(inhal): 5.383
Proc 8a	EE(inhal): 10.767
Proc 8b	EE(inhal): 1.615
Proc 9	EE(inhal): 5.383

#### 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 3	RCR(inhal): 0.111
Proc 5	RCR(inhal): 0.186
Proc 8a	RCR(inhal): 0.371
Proc 8b	RCR(inhal): 0.056
Proc 9	RCR(inhal): 0.186

#### 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(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

## Number of the ES 3

Short title of the exposure scenario

### Use in laboratories

#### Sector of uses [SU]

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

#### Process categories [PROC]

PROC15: Use as laboratory reagent

#### Product characteristics

Refer to attached safety data sheets

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## Processes and activities covered by the exposure scenario

Use of the substance within laboratory settings, including material transfers and equipment cleaning

## Further explanations

Industrial use

## Number of the contributing scenario

1

## Contributing exposure scenario controlling worker exposure for PROC 15

### Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to palm of 1 hand (240 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); 0 % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

## Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative short-term exposure [mg/m<sup>3</sup>]; EE(derm): Estimated dermal short-term exposure [mg/kg b.w./d]. 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 15

EE(inhal): 5.383

## 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): 0.186

## 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(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

## Number of the ES 4

Short title of the exposure scenario

**Rubber production and processing**

## Sector of uses [SU]

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

## Process categories [PROC]

PROC7: Industrial spraying

PROC14: production of preparations or articles by tableting, compression, extrusion, pelettisation

PROC21: Low energy manipulation of substances bound in materials and/or articles

PROC24: High (mechanical) energy work-up of substances bound in materials and/or articles

## Product characteristics

Refer to attached safety data sheets

## Processes and activities covered by the exposure scenario

Manufacture of tyres and general rubber articles, including processing of raw (uncured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing

## Further explanations

Industrial use

### Number of the contributing scenario

1

### Contributing exposure scenario controlling worker exposure for PROC 7

## Further specification

StoffenManager

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

Room volume 100 - 1000 m<sup>3</sup>

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 97% % (inhalative); n.a. % (dermal).

### Organisational measures to prevent /limit releases, dispersion and exposure

Clean equipment and the work area every day

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

Wear respiratory protection (Efficiency: 80 %). Wear suitable coveralls to prevent exposure to the skin. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

### Number of the contributing scenario

2

### Contributing exposure scenario controlling worker exposure for PROC 7

## Further specification

StoffenManager

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Other given operational conditions affecting workers exposure

Indoor use

Room volume 100 - 1000 m<sup>3</sup>

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 97 % (inhalative); n.a. % (dermal). Use cabin with filtered air for operator.

### Organisational measures to prevent /limit releases, dispersion and exposure

Clean equipment and the work area every day

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

Wear suitable coveralls to prevent exposure to the skin. Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

### Number of the contributing scenario

3

### Contributing exposure scenario controlling worker exposure for



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## PROC 14

### Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to palm of 2 hands (480 cm<sup>2</sup>)

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); n.a. % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

### Number of the contributing scenario

4

### Contributing exposure scenario controlling worker exposure for

## PROC 21

### Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Solid, high dustiness

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to 1980 cm<sup>2</sup>

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); n.a. % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

### Number of the contributing scenario

5

### Contributing exposure scenario controlling worker exposure for

## PROC 24

### Further specification

Ecetoc TRA V2 modified

### Product characteristics

Covers percentage substance in the product up to 100 % (unless stated differently)

Solid, high dustiness

### Frequency and duration of use

8 h (full shift)

### Human factors not influenced by risk management

corresponds to 1980 cm<sup>2</sup>

### Other given operational conditions affecting workers exposure

Indoor use

### Technical conditions and measures to control dispersion from source towards the worker

Effectiveness of LEV (local exhaust ventilation): 90 % (inhalative); n.a. % (dermal).

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

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.

### Human exposure prediction (oral, dermal, inhalative)

Oral exposure is not expected to occur. EE(inhal): Estimated inhalative short-term exposure [mg/m<sup>3</sup>]; EE(derm): Estimated dermal short-term exposure [mg/kg b.w./d]. Exposure estimates are given for either short-term or long-term exposure depending on which lead to more conservative risk characterisation ratios. The RMMs



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described above suffice to control risks for both local and systemic effects.

Proc 7	EE(inhal): 7.54 ; EE(derm): n.a. - Contributing Scenarios 1 EE(inhal): 5.87 ; EE(derm): n.a. - Contributing Scenarios 2
Proc 14	EE(inhal): 5.383
Proc 21	EE(inhal): 2
Proc 24	EE(inhal): 4

## **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): 0.260 - Contributing Scenarios 1 RCR(inhal): 0.200 - Contributing Scenarios 2
Proc 14	RCR(inhal): 0.186
Proc 21	RCR(inhal): 0.069
Proc 24	RCR(inhal): 0.138

## **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(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