SAFETY DATA SHEET

Di-n-butylamine
10220

Version / Revision	5	**Revision Date**	26-Apr-2021
Supersedes Version	4.00***	**Issuing date**	26-Apr-2021

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
+65 3158 1198 (available 24/7)
000800 100 7479 (for domestic shipments only)

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 3, H301***
Acute dermal toxicity Category 3, H311
Acute inhalation toxicity Category 2, H330
Skin corrosion/irritation Category 1B, H314***
Serious eye damage/eye irritation Category 1, H318

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

2.2. Label elements

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

Hazard pictograms

Signal word **Danger**

Hazard statements
H226: Flammable liquid and vapour.
H301: Toxic 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.
P321: Specific treatment: IF ON SKIN: Wash off with 3% acetic acid followed by large amounts of plain water for at least 5 min as a final step.
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER/doctor.
P403 + P235: Store in a well ventilated place. Keep cool.
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 (%)
Dibutylamine	111-92-2	01-2119475606-30	Flam. Liq. 3; H226	> 99,5

			Acute Tox. 3; H301 Acute Tox. 3; H311 Acute Tox. 2; H330 Skin Corr. 1B; H314 Eye Dam. 1; H318***	

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

SECTION 4: First aid measures

4.1. Description of first aid measures

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

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

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.

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 (CO2), water spray

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

5.2. Special hazards arising from the substance or mixture

Under conditions giving incomplete combustion, hazardous gases produced may consist of:
carbon monoxide (CO)
carbon dioxide (CO2)
nitrogen oxides (NOx)
Combustion gases of organic materials must in principle be graded as inhalation poisons
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

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

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Exposure limits India

No exposure limits established.

8.2. Exposure controls

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.

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.

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

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

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

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.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	liquid
Colour	colourless
Odour	ammonia-like
Odour threshold	No data available
pH	11,3 (1 g/l in water @ 25 °C (77 °F)) DIN 19268***
Melting point/range	-61 °C (Pour point)
Boiling point/range	159 °C @ 1013 hPa

Flash point	41 °C
Method	DIN EN ISO 2719***
Evaporation rate	No data available
Flammability (solid, gas)	Does not apply, the substance is a liquid
Lower explosion limit	1,1 Vol %
Upper explosion limit	6,8 Vol %

Vapour pressure

Values [hPa]	Values [kPa]	Values [atm]	@ °C	@ °F	Method
6***	0,6***	0,006***	20	68	DIN EN 13016-2***

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

Relative density

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

Solubility	3,8 g/l @ 20 °C, in water, OECD 105***
log Pow	2.9 (measured), OECD 117
Autoignition temperature	255 °C @ 1021 hPa***
Method	DIN 51794
Decomposition temperature	No data available
Viscosity	0,894 mPa*s @ 20 °C
Method	dynamic, ASTM D445***
Oxidizing properties	Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties
Explosive properties	Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties

9.2. Other information

Molecular weight	129,24
Molecular formula	C8 H19 N
log Koc	3,12 @ pH 5 - 8 calculated***
Dissociation constant	pKa 11 @ 20,7 °C (69,3 °F) OECD 112***
Refractive index	1,417 @ 20 °C
Surface tension	50,6 mN/m @ 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.

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				
Dibutylamine (111-92-2)				
Routes of Exposure	Endpoint	Values	Species	Method
Oral	LD50	189-550 mg/kg	rat, male	Weight of evidence***
Dermal	LD50	768 mg/kg	rabbit male***	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

Irritation and corrosion				
Dibutylamine (111-92-2)				
Target Organ Effects	Species	Result	Method	
Skin	rabbit	corrosive	OECD 404	< 3 min
Eyes	rabbit	corrosive	OECD 405	
Respiratory tract***	mouse***	RD50: 173 ppm***		

Dibutylamine, CAS: 111-92-2
Assessment
The available data lead to the classification given in section 2***

Sensitization				
Dibutylamine (111-92-2)				
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

Subacute, subchronic and prolonged toxicity

Dibutylamine (111-92-2)				
Type	Dose	Species	Method	
Subchronic toxicity	NOAEC: 50 mg/m³ (90 d) Local effects***	rat, male	OECD 413	Inhalation
Subchronic toxicity***	NOAEC: 450 mg/m³ (90 d) systemic effects***	rat, male/female***	OECD 413***	Inhalation***

Dibutylamine, CAS: 111-92-2

Assessment

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

Carcinogenicity, Mutagenicity, Reproductive toxicity					
Dibutylamine (111-92-2)					
Type	Dose	Species	Evaluation	Method	
Mutagenicity		Salmonella typhimurium	negative	Ames test	In vitro study
Mutagenicity		mouse	negative	OECD 474***	Bone marrow
Mutagenicity		mouse lymphoma cells	negative	OECD 476 (Mammalian Gene Mutation)	In vitro study
Mutagenicity		CHL	ambiguous	OECD 473 (Chromosomal Aberration)	In vitro study
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

Acute aquatic toxicity			
Dibutylamine (111-92-2)			
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: 19,2 mg/l (Growth rate)	DIN 38412, part 9
Pseudomonas putida	17 h	EC50: 195,8 mg/l (Growth inhibition)	DIN 38412, part 8
Oryzias latipes (Medaka)***	96h***	LC50: 26,7 mg/l***	OECD 203 read across***
Daphnia magna (Water flea)***	48h***	EC50: 58 mg/l***	OECD 202 read across***
Pseudokirchneriella subcapitata***	72h***	EC50: 50,9 mg/l (Growth rate)***	OECD 201 read across***

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
Reproductive toxicity***	Daphnia magna (Water flea)***	EC10: 4,07 mg/l (21 d)***	OECD 211***	read across***
Aquatic toxicity***	Pseudokirchneriella subcapitata***	EC10: 34,3 mg/l (3 d) Growth rate***	OECD 201***	read across***
Aquatic toxicity***	Desmodesmus subspicatus***	NOEC: <0,63 mg/l (3d) Growth rate***	DIN 38412 / part 9***	

Terrestrial toxicity				
Dibutylamine (111-92-2)				
Species	Exposure time	Dose	Type	Method
Lactuca sativa (Lettuce)***	7 d***	EC50: 510 mg/kg soil dw***	Growth***	OECD 208***
Lactuca sativa (Lettuce)***	14 d***	EC50: 361 mg/kg soil dw***	Growth***	OECD 208***

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	5,75 - 46,02	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: 0,27 Water: 26,9 Sediment: 0,27	Calculation according Mackay, Level I***

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

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

ICAO-TI / IATA-DGR

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	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

International Inventories

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 India

Hazardous Chemicals, Schedule 2: Threshold Quantities at an Isolated Storage
not listed

Hazardous Chemicals, Schedule 3: Threshold Quantities in an Industrial Installation
not listed

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

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3
H226: Flammable liquid and vapour.
H301: Toxic 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

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