SAFETY DATA SHEET

Di-n-butylamine
10220

Version / Revision	4	**Revision Date**	26-Apr-2021
Supersedes Version	3.00***	**Issuing date**	26-Apr-2021

SECTION 1: Identification

1.1. Product identifier

Identification of the substance/preparation **Di-n-butylamine**

CAS-No 111-92-2

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

Use of the Substance / Preparation Intermediate

Uses advised against None

1.3. Details of the supplier of the safety data sheet

Supplier

OQ Chemicals Corporation
15375 Memorial Drive
West Memorial Place I
Suite 300
Houston, TX 77079
USA
Phone +1 346 378 7300

Product Information

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

1.4. Emergency telephone number

Emergency telephone number NCEC +1 202 464 2554
available 24/7

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is classified in accordance with paragraph (d) of §1910.1200 (GHS-US classification).

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

Flammable liquid Category 3, H226
Environmental hazard Aquatic Acute 2; H401

OSHA Specified Hazards Not applicable.

2.2. Label elements

Labeling according to §1910.1200 (GHS-US labeling).

Hazard symbol(s)

Signal word **Danger**

Hazard statements
H226: Flammable liquid and vapor.
H301: Toxic if swallowed.
H311: Toxic in contact with skin.
H330: Fatal if inhaled.
H314: Causes severe skin burns and eye damage.
H401: Toxic to aquatic life***

Precautionary statements

Prevention
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233: Keep container tightly closed.
P240: Ground and bond container and receiving equipment.
P241: Use explosion-proof electrical/ ventilating/ lighting equipment.
P242: Use non-sparking tools.
P243: Take precautionary measures against static discharge.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well ventilated area.
P284: Wear respiratory protection.
P260: Do not breathe gas/mist/vapours.
P273: Avoid release to the environment.***

Response
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.
P361: Take off immediately all contaminated clothing and wash it before reuse.
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.
Storage	P403 + P235: Store in a well ventilated place. Keep cool. P405: Store locked up.
Disposal	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

SECTION 3: Composition / information on ingredients

3.1. Substances

Component	CAS-No	Concentration (%)
Dibutylamine	111-92-2	> 99,5

SECTION 4: First aid measures

4.1. Description of first aid measures

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

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

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

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

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

Main symptoms
shortness of breath, convulsions, cough, hypertensive effect, 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

SECTION 8: Exposure controls / personal protection

8.1. Control parameters

Exposure limits United States of America

No exposure limits established regarding ACGIH, OSHA Z-1 and OSHA Z-2.

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.

Individual protection measures, such as 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.

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 filter for ammonia vapour and ammonia derivatives (K Filter). Use the indicated respiratory protection if the occupational exposure limit is exceeded and/or in case of product release (vapor or mist). Equipment should conform to NIOSH.

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	-77,8 °F (-61 °C) (Pour point)
Method	DIN ISO 3016***
Boiling point/range	318,2 °F (159 °C) @ 1 atm (101,3 kPa)
Method	OECD 103***
Flash point	105,8 °F (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 (68 °F), in water, OECD 105***
log Pow	2.9 (measured) OECD 117
Autoignition temperature	491 °F (255 °C) @ 1021 hPa***
Method	DIN 51794
Decomposition temperature	No data available

Viscosity	0,894 mPa*s @ 68 °F (20 °C)
Method	dynamic, ASTM D445***

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***
Oxidizing properties	Does not apply, substance is not oxidising. There are no chemical groups associated with oxidizing properties
Refractive Index	1,417 @ 68 °F (20 °C)
Explosive properties	Does not apply, substance is not explosive. There are no chemical groups associated with explosive properties
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

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

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
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.

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

D.O.T. (49CFR)

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	
Emergency Response Guide	132

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

Federal and State Regulations

Components of the product are listed in the quoted regulations. For details please refer to the regulations directly. This list is not exhaustive, please check for other applicable regulations.

Federal Regulations

This product is listed on the TSCA inventory

State Regulations

Dibutylamine, CAS: 111-92-2

MA RTK List
NY RTK List
PA RTK List
RI RTK List

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)

SECTION 16: Other information

Revision Date	26-Apr-2021
Issuing date	26-Apr-2021

Hazard Rating Systems

NFPA (National Fire Protection Association)

Health Hazard	3
Fire Hazard	2
Reactivity	0

HMIS (Hazardous Material Information System)

Health Hazard	3
Flammability	2
Physical Hazard	0

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).
The use of a comma in section 3 and section 7 to 12 is the same as a period.

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End of Safety Data Sheet