

Product safety summary

Dibutyl fumarate (DBF)

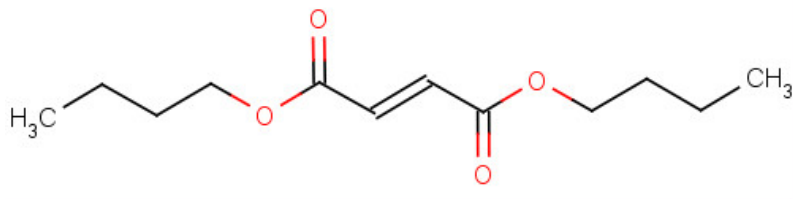
1. General Statement

DBF is produced for the use as monomer for production of polymers and as intermediate for synthesis of chemical intermediates or chemical substances. The substance is manufactured and handled in industrial settings in closed systems.

2. Chemical Identity

EC number:	203-327-9
EC name:	dibutyl fumarate
CAS number (EC inventory):	105-75-9
IUPAC name:	dibutyl but-2-enedioate
Molecular formula:	C ₁₂ H ₂₀ O ₄
Molecular weight range:	228.2

Structural formula:



3. Uses and applications

DBF is produced for the use as monomer for production of polymers and as intermediate for synthesis of chemical intermediates or chemical substances.

4. Physical/Chemical Properties

DBF is a colourless liquid with the following physical/chemical properties:

Property	Value
Physical state	Liquid
Melting / boiling point	< -22 °C
Boiling point	DBF decomposed before boiling at about 270 °C. The decomposed test substance boiled from 385 °C on. The calculated boiling temperature is 266.9 °C.
Flammability	Not relevant (liquid)
Explosive properties	Not explosive

Self-ignition temperature	255 °C at 99.5 kPa
Vapour pressure	0.164 Pa at 20 °C and 0.323 Pa at 25 °C
Water solubility	11.1 mg/L at 20 °C
Flash point	144.2 °C
Octanol-water partition coefficient (log Kow)	4.6 (pH 7)

Based on these data DBF is not classified as hazardous.

5. Health Effects

Consumer: Consumer exposure is very unlikely as the DBF is manufactured and handled in industrial settings in closed systems (used as monomer in polymerization).

Worker: Workers will not come into contact with DBF as the substance is manufactured and handled in industrial settings in closed systems. In case of unintended exposure during maintenance, sampling, testing, or other procedures, workers should follow the recommended safety measures in the extended Safety Data Sheet (extSDS). Given the skin irritating and sensitizing properties, skin contact should be avoided.

Effect Assessment	Result
Acute Toxicity	Not toxic after oral, dermal and inhalation exposure
Irritation	Causes skin irritation. Not irritating to the eyes.
Sensitisation	Sensitizing by skin contact
Mutagenicity	Not mutagenic
Toxicity after repeated exposure	No data available. Given the limited life cycle of the substance as a monomer and the use under very controlled conditions, repeated exposure will not occur in practice. The available physicochemical and toxicological properties do not give any reason for concern.
Toxicity for reproduction	No data available. Given the limited life cycle of the substance as a monomer and the use under very controlled conditions, repeated exposure will not occur in practice. The available physicochemical and toxicological properties do not give any reason for concern.

Based on this information the substance is classified.

6. Environmental Effects

Effect Assessment	Result
Aquatic Toxicity	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Fate and behaviour	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not bioaccumulative
PBT / vPvB conclusion	Not considered to be either PBT nor vPvB.

Based on available data for the pure substance, DBF is very toxic to aquatic organisms and is classified. The amount of the substance released into the aquatic environment, however, is low indicating no risk for the aquatic environment. This is confirmed by an environmental exposure assessment showing that the substance can be handled safe during all steps of manufacture and industrial use. Furthermore it does not bioaccumulate, is readily biodegradable and will not persist in the environment.

7. Exposure

Consumers will not come into contact with DBF as it is manufactured in a closed process which also minimizes employee exposure potential. Exposure to DBF of personnel in manufacturing facilities is also considered very low because the process, storage and handling operations are enclosed. Workers who might accidentally come in contact with the non formulated, undiluted substance should follow the safety measures recommended in the Extended Safety Data Sheet (eSDS), as the non formulated, undiluted substance causes skin irritation and is a skin sensitizer.

The manufacture is a closed and automated process with very little aqueous and gaseous effluent released to the environment. During the industrial use of the substance there is also a "No release" policy with all effluent being stored in special closed containers dedicated to emission reducing equipment.

8. Risk Management Recommendations

When using chemicals make sure that there is adequate ventilation. Always use appropriate chemical resistant gloves to protect your hands and skin and always wear eye protection such as chemical goggles. Do not eat, drink, or smoke where chemicals are handled, processed, or stored. Wash hands and skin following contact. If the substance gets into your eyes, rinse eyes thoroughly for at least 15 minutes with tap water and seek medical attention.

In case of accidental release do not allow the product to enter sewers, surface or ground water. Absorb with liquid-binding material. In case of entry into waterways, soils or drains, inform the responsible authorities. Discharge into waste water channels and biological treatment plants only after clearance with the operating company and in accordance with local authority approval.

9. Regulatory Information / Classification and Labelling

Regulatory information

DBF was registered in accordance with the REACH regulation (registration number: 01-2119486395-26-0000). DBF neither nor contains more than 0.1% w/w of a substance classified

as CMR Cat. 1 or 2 or a substance of Very High Concern (SVHC) which is in the current list of candidates for including to the list of substances subjected to authorization.

Classification and labelling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the extended SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

Classification

DBF is classified as follows:

Skin Sens. 1

Aquatic Chronic 1

Aquatic Acute 1

Labelling

Signal word: Warning

Hazard pictogram:

GHS07: exclamation mark



GHS09: environment



Hazard statements:

H400: Very toxic to aquatic life.

H410: Very toxic to aquatic life with long lasting effects.

H317: May cause an allergic skin reaction.

10. Contact information within company

For further information on DBF or product safety summaries in general, please contact:
info.gps@dsm.com

For more product safety summaries, please visit:

→ http://www.dsm.com/en_US/html/reach/gps.htm

→ <http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>

11. Date

Date of issue: March 28, 2011

Date of revision: -

Disclaimer

This product safety summary is intended to give general information about the chemical or categories of chemical addressed. It is not intended to provide an in-depth analysis of health and safety information. Additional information is available through the chemical's applicable Material Safety Data Sheet, which should be consulted before use of the chemical. This product safety summary does not supply or replace required regulatory and/or legal communication documents. All information contained herein is presented on an 'as is' basis and state of technology as per the issue date. The internet disclaimer is applicable (http://en.dsm.mobi/pda_terms_eng.html).