

Safety Data Sheet

Morpholine

Revision date : 2015/05/26
Version: 3.0

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(30036734/SDS_GEN_US/EN)

1. Identification

Product identifier used on the label

Morpholine

Recommended use of the chemical and restriction on use

* The "Recommended use" identified for this product is provided solely to comply with a Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:

BASF CORPORATION
100 Park Avenue
Florham Park, NJ 07932, USA

Telephone: +1 973 245-6000

Emergency telephone number

CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP (4357)

Other means of identification

Molecular formula: C(4)H(9)NO
Chemical family: secondary amines, aliphatic
Synonyms: Morpholine

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Classification of the product

Flam. Liq.	3	Flammable liquids
Acute Tox.	3 (Inhalation - vapour)	Acute toxicity
Acute Tox.	4 (oral)	Acute toxicity
Acute Tox.	3 (dermal)	Acute toxicity
Skin Corr./Irrit.	1A	Skin corrosion/irritation
Eye Dam./Irrit.	1	Serious eye damage/eye irritation
Aquatic Acute	3	Hazardous to the aquatic environment - acute

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Label elements

Pictogram:



Signal Word:
Danger

Hazard Statement:

H226	Flammable liquid and vapour.
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H402	Harmful to aquatic life.

Precautionary Statements (Prevention):

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P271	Use only outdoors or in a well-ventilated area.
P261	Avoid breathing vapours.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe mist or vapour.
P260	Do not breathe dust or mist.
P243	Take precautionary measures against static discharge.
P273	Avoid release to the environment.
P241	Use explosion-proof electrical/ventilating/lighting/equipment.
P264	Wash with plenty of water and soap thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P242	Use only non-sparking tools.
P240	Ground/bond container and receiving equipment.

Precautionary Statements (Response):

P310	Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P361 + P364	Remove/Take off immediately all contaminated clothing and wash before reuse.
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P370 + P378	In case of fire: Use water spray, dry powder, foam or carbon dioxide for extinction.

Precautionary Statements (Storage):

P403 + P235	Store in a well-ventilated place. Keep cool.
P233	Keep container tightly closed.
P405	Store locked up.

Precautionary Statements (Disposal):

P501	Dispose of contents/container to hazardous or special waste collection point.
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Hazards not otherwise classified

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Emergency overview

DANGER:
CORROSIVE.
FLAMMABLE LIQUID.
HARMFUL IF SWALLOWED.
HARMFUL IF ABSORBED THROUGH SKIN.
HARMFUL IF INHALED.
Corrosive to the skin, eyes and respiratory system.
CAUSES SEVERE BURNS.
RISK OF SERIOUS DAMAGE TO EYES.
INGESTION MAY CAUSE GASTRIC DISTURBANCES.
Avoid contact with the skin, eyes and clothing.
Use with local exhaust ventilation.
Avoid inhalation of mists/vapours.
Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator.
Wear NIOSH-certified chemical goggles.
Wear protective clothing.
Eye wash fountains and safety showers must be easily accessible.
Wear chemical resistant protective gloves.
Wear full face shield if splashing hazard exists.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Weight %</u>	<u>Chemical name</u>
110-91-8	>= 99.45 - <= 99.7%	morpholine

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Weight %</u>	<u>Chemical name</u>
110-91-8	> 99.0%	morpholine
100-74-3	< 0.2%	4-ethylmorpholine
107-15-3	< 0.3%	ethylenediamine
7732-18-5	< 0.2%	Water
109-86-4	< 0.5%	2-methoxyethanol

4. First-Aid Measures

Description of first aid measures

General advice:

Remove contaminated clothing.

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If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required.

If on skin:

Wash affected areas thoroughly with soap and water. Immediate medical attention required.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

If swallowed:

Do not induce vomiting. Rinse mouth and then drink plenty of water. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

Most important symptoms and effects, both acute and delayed

Symptoms: Overexposure may cause: , nausea, diarrhea, coughing, headache

Indication of any immediate medical attention and special treatment needed

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
water spray, dry powder, foam, carbon dioxide

Special hazards arising from the substance or mixture

Hazards during fire-fighting:
Substance/product is dangerous when exposed to heat or flames. If product is heated above decomposition temperature, toxic vapours will be released.

Advice for fire-fighters

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:

If exposed to fire, keep containers cool by spraying with water. Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems.

Impact Sensitivity:

Remarks: Based on the chemical structure there is no shock-sensitivity.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear appropriate respiratory protection. Use personal protective clothing. Ensure adequate ventilation.

Environmental precautions

Substance/product is RCRA hazardous due to its properties.

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Methods and material for containment and cleaning up

Spills should be contained, solidified, and placed in suitable containers for disposal.

7. Handling and Storage

Precautions for safe handling

Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. Ensure thorough ventilation of stores and work areas.

Protection against fire and explosion:

Prevent electrostatic charge - sources of ignition should be kept well clear - fire extinguishers should be kept handy.

Conditions for safe storage, including any incompatibilities

Segregate from acids and acid forming substances.

Suitable materials for containers: Carbon steel (Iron), Stainless steel 1.4301 (V2), Stainless steel 1.4541, Stainless steel 1.4401, Stainless steel 1.4571, Low density polyethylene (LDPE), High density polyethylene (HDPE), glass

Further information on storage conditions: Containers should be stored tightly sealed in a dry place. Avoid extreme heat. Keep container tightly closed. Keep away from sources of ignition - No smoking.

Storage stability:

Storage duration: 24 Months

From the data on storage duration in this safety data sheet no agreed statement regarding the warrantee of application properties can be deduced.

8. Exposure Controls/Personal Protection

No occupational exposure limits known.

Advice on system design:

Provide local exhaust ventilation to control vapours/mists.

Personal protective equipment

Respiratory protection:

Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator. Do not exceed the maximum use concentration for the respirator facepiece/cartridge combination. For emergency or non-routine, high exposure situations, use a NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

Hand protection:

Chemical resistant protective gloves

Eye protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

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Body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

General safety and hygiene measures:

Eye wash fountains and safety showers must be easily accessible. Wear protective clothing as necessary to prevent contact. When using, do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. Store work clothing separately.

9. Physical and Chemical Properties

Form:	liquid	
Odour:	amine-like	
Odour threshold:	Not determined since toxic by inhalation.	
Colour:	colourless to yellow	
pH value:	10.1 (5 g/l)	
Melting point:	-5 °C	
Boiling point:	128 - 130 °C	
Flash point:	32 °C	(DIN 51755)
Flammability:	Flammable.	
Lower explosion limit:	For liquids not relevant for classification and labelling. The lower explosion point may be 5 - 15 °C below the flash point.	
Upper explosion limit:	For liquids not relevant for classification and labelling.	
Autoignition:	255 °C	(DIN 51794)
Vapour pressure:	10 mbar (20 °C)	
Density:	1.00 g/cm ³ (20 °C)	
Relative density:	1.0007 (20 °C)	
	Literature data.	
Partitioning coefficient n-octanol/water (log Pow):	-2.55 (25 °C)	
Self-ignition temperature:	not self-igniting	
Thermal decomposition:	390 °C, 500 kJ/kg (DSC (DIN 51007)) Thermal decomposition above the indicated temperature is possible.	
Viscosity, dynamic:	2.23 mPa.s (20 °C)	
	Literature data.	
Particle size:	The substance / product is marketed or used in a non solid or granular form.	
% volatiles:	0.00 %	
Solubility in water:	(20 °C) miscible	

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Solubility (qualitative):	miscible solvent(s): organic solvents,
Molar mass:	87.12 g/mol
Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.

10. Stability and Reactivity

Reactivity

Corrosion to metals:
No corrosive effect on metal.

Oxidizing properties:
Based on its structural properties the product is not classified as oxidizing.

Formation of flammable gases:	Remarks:	Forms no flammable gases in the presence of water.
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Chemical stability

Possibility of hazardous reactions

The product is chemically stable.
Reacts with oxidizing agents.

Conditions to avoid

Avoid all sources of ignition: heat, sparks, open flame.

Incompatible materials

oxidizing agents, mineral acids

Hazardous decomposition products

Thermal decomposition:
390 °C (DSC (DIN 51007))
Thermal decomposition above the indicated temperature is possible.

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity

Assessment of acute toxicity: Of moderate toxicity after short-term inhalation. Of moderate toxicity after single ingestion. Of pronounced toxicity after short-term skin contact.

Oral

Type of value: LD50
Species: rat
Value: approx. 1,910 mg/kg (BASF-Test)

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Inhalation

Type of value: LC50
Species: rat
Value: 8 mg/l conservative approach

Dermal

Type of value: LD50
Species: rabbit
Value: approx. 500 mg/kg
Literature data.

Assessment other acute effects

Assessment of STOT single:
Based on the available information there is no specific target organ toxicity to be expected after a single exposure.

Irritation / corrosion

Assessment of irritating effects: Highly corrosive! Damages skin and eyes.
Irritating to eyes and skin.

Skin

Result: strongly corrosive
Method: OECD Guideline 404

Eye

Species: rabbit
Result: Risk of serious damage to eyes.
Method: BASF-Test

Species: rabbit
Result: Risk of serious damage to eyes.
Method: OECD Guideline 405

Sensitization

Assessment of sensitization: Study scientifically not justified.

Aspiration Hazard

No aspiration hazard expected.

Chronic Toxicity/Effects

Repeated dose toxicity

Assessment of repeated dose toxicity: The substance may cause damage to the lung after repeated inhalation. May affect the liver and kidneys as indicated in animal studies.
After repeated exposure the prominent effect is local irritation.

Genetic toxicity

Assessment of mutagenicity: In the majority of tests performed (bacteria/microorganisms/cell cultures) a mutagenic effect was not found. A mutagenic effect was also not observed in in-vivo assays.

Carcinogenicity

Assessment of carcinogenicity: Results from a number of long-term carcinogenicity studies and short-term tests are available. Taking into account all of the information, there is no indication that the substance itself is carcinogenic. IARC Group 3 (not classifiable as to human carcinogenicity).

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Under certain conditions the substance can form nitrosamines. Nitrosamines are carcinogenic in animal studies.

In long-term studies in rats and mice in which the substance was given by inhalation, a carcinogenic effect was not observed.

Reproductive toxicity

Assessment of reproduction toxicity: Study does not need to be conducted.

Teratogenicity

Assessment of teratogenicity: No indications of a developmental toxic / teratogenic effect were seen in animal studies. The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.

Symptoms of Exposure

Overexposure may cause:, nausea, diarrhea, coughing, headache

Medical conditions aggravated by overexposure

Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product. See MSDS section 11 - Toxicological information.

12. Ecological Information

Toxicity

Aquatic toxicity

Assessment of aquatic toxicity:

Acutely harmful for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Toxicity to fish

LC50 (96 h) 180 mg/l, *Salmo gairdneri*, syn. *O. mykiss* (Fish test acute, static)

The details of the toxic effect relate to the nominal concentration. The study was carried out in soft water. Literature data.

LC50 (96 h) 380 mg/l, *Salmo gairdneri*, syn. *O. mykiss* (Fish test acute, static)

The details of the toxic effect relate to the nominal concentration. The study was carried out in hard water. Literature data.

Aquatic invertebrates

EC50 (48 h) 45 mg/l, *Daphnia magna* (OECD Guideline 202, part 1, static)

Literature data.

Aquatic plants

EC50 (96 h) 28 mg/l, *Pseudokirchneriella subcapitata* (Growth Inhibition Test)

The statement of the toxic effect relates to the analytically determined concentration. Literature data.

EC0 (96 h) 10 mg/l, *Pseudokirchneriella subcapitata* (Growth Inhibition Test)

The statement of the toxic effect relates to the analytically determined concentration. Literature data.

Chronic toxicity to fish

Study scientifically not justified.

Chronic toxicity to aquatic invertebrates

No observed effect concentration (21 d) 5 mg/l, *Daphnia magna* (OECD Guideline 211, semistatic)

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Assessment of terrestrial toxicity

No toxic effects have been observed in studies with terrestrial plants.

Microorganisms/Effect on activated sludge

Toxicity to microorganisms

OECD Guideline 209 activated sludge, domestic/EC20 (30 min): > 1,000 mg/l
The details of the toxic effect relate to the nominal concentration. Literature data.

OECD Guideline 209 activated sludge, industrial/EC20 (0.5 h): > 1,000 mg/l
The details of the toxic effect relate to the nominal concentration.

DIN EN ISO 8192 activated sludge, industrial/EC20 (30 h): < 1,000 mg/l

Persistence and degradability

Assessment biodegradation and elimination (H₂O)

Readily biodegradable (according to OECD criteria).

Elimination information

90 - 100 % DOC reduction (25 d) (OECD 301E/92/69/EEC, C.4-B) (aerobic, municipal sewage treatment plant effluent)

Assessment of stability in water

According to structural properties, hydrolysis is not expected/probable.

Bioaccumulative potential

Assessment bioaccumulation potential

Accumulation in organisms is not to be expected.

Bioaccumulation potential

Bioconcentration factor: < 2.8 (42 d), *Cyprinus carpio* (OECD Guideline 305 C)

Mobility in soil

Assessment transport between environmental compartments

The substance will not evaporate into the atmosphere from the water surface.

Adsorption to solid soil phase is not expected.

The data refers to the undissociated form of the substance.

Additional information

The product contains:

The heavy-metal content in the product is below the limit values laid down in normative EN 71 Part III.

13. Disposal considerations

Waste disposal of substance:

Dispose of in a RCRA-licensed facility. Do not discharge into waterways or sewer systems without proper authorization. Dispose of in accordance with national, state and local regulations.

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Container disposal:

Dispose of in a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

RCRA: D001

14. Transport Information

Land transport

USDOT

Hazard class: 8
Packing group: I
ID number: UN 2054
Hazard label: 8, 3
Proper shipping name: MORPHOLINE

Sea transport

IMDG

Hazard class: 8
Packing group: I
ID number: UN 2054
Hazard label: 8, 3
Marine pollutant: NO
Proper shipping name: MORPHOLINE

Air transport

IATA/ICAO

Hazard class: 8
Packing group: I
ID number: UN 2054
Hazard label: 8, 3
Proper shipping name: MORPHOLINE

15. Regulatory Information

Federal Regulations

Registration status:

Chemical TSCA, US released / listed

EPCRA 311/312 (Hazard categories): Acute; Chronic; Fire

CERCLA RQ

5000 LBS

100 LBS

CAS Number

107-15-3

100-74-3; 110-91-

8

Chemical name

ethylenediamine

4-ethylmorpholine; morpholine

State regulations

State RTK

PA

CAS Number

109-86-4

Chemical name

2-methoxyethanol

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MA	109-86-4	2-methoxyethanol
NJ	110-91-8	morpholine

CA Prop. 65:

WARNING: THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

NFPA Hazard codes:

Health : 3 Fire: 3 Reactivity: 0 Special:

HMIS III rating

Health: 3 α Flammability: 3 Physical hazard: 0

Assessment of the hazard classes according to UN GHS criteria (most recent version):

Aquatic Acute	3	Hazardous to the aquatic environment - acute
Flam. Liq.	3	Flammable liquids
Acute Tox.	3 (dermal)	Acute toxicity
Acute Tox.	4 (oral)	Acute toxicity
Acute Tox.	3 (Inhalation - vapour)	Acute toxicity
Skin Corr./Irrit.	1A	Skin corrosion/irritation
Eye Dam./Irrit.	1	Serious eye damage/eye irritation

16. Other Information

SDS Prepared by:

BASF NA Product Regulations
SDS Prepared on: 2015/05/26

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

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