

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 29.06.2018

Version 12.3

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

### 1.1 Product identifier

Catalogue No.	800947
Product name	Ethylenediamine for synthesis
REACH Registration Number	01-2119480383-37-xxxx
CAS-No.	107-15-3

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

Identified uses	Chemical for synthesis
	For additional information on uses please refer to the Merck Chemicals portal ( <a href="http://www.merckgroup.com">www.merckgroup.com</a> ).

### 1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: <a href="mailto:prodsafe@merckgroup.com">prodsafe@merckgroup.com</a>

1.4 Emergency telephone number	Please contact the regional company representation in your country.
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## SECTION 2. Hazards identification

### 2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 800947

Product name Ethylenediamine for synthesis

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Flammable liquid, Category 3, H226

Acute toxicity, Category 4, Oral, H302

Acute toxicity, Category 4, Inhalation, H332

Acute toxicity, Category 3, Dermal, H311

Skin corrosion, Category 1B, H314

Respiratory sensitisation, Category 1, H334

Skin sensitisation, Category 1, H317

Chronic aquatic toxicity, Category 3, H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

## 2.2 Label elements

**Labelling (REGULATION (EC) No 1272/2008)**

*Hazard pictograms*



*Signal word*

Danger

*Hazard statements*

H226 Flammable liquid and vapour.

H302 + H332 Harmful if swallowed or if inhaled.

H311 Toxic in contact with skin.

H314 Causes severe skin burns and eye damage.

H317 May cause an allergic skin reaction.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H412 Harmful to aquatic life with long lasting effects.

*Precautionary statements*

Prevention

P210 Keep away from heat.

P273 Avoid release to the environment.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 800947  
Product name Ethylenediamine for synthesis

---

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

## Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

## Reduced labelling (≤125 ml)

### Hazard pictograms



### Signal word

Danger

### Hazard statements

H311 Toxic in contact with skin.

H314 Causes severe skin burns and eye damage.

H317 May cause an allergic skin reaction.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H412 Harmful to aquatic life with long lasting effects.

### Precautionary statements

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Contains: ethylenediamine

Index-No. 612-006-00-6

## 2.3 Other hazards

None known.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

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## SECTION 3. Composition/information on ingredients

### 3.1 Substance

Formula	H <sub>2</sub> NCH <sub>2</sub> CH <sub>2</sub> NH <sub>2</sub>	C <sub>2</sub> H <sub>8</sub> N <sub>2</sub> (Hill)
Index-No.	612-006-00-6	
EC-No.	203-468-6	
Molar mass	60,10 g/mol	

### Hazardous components (REGULATION (EC) No 1272/2008)

*Chemical name (Concentration)*

CAS-No.	Registration number	Classification
ethylenediamine (<= 100 % )		

107-15-3	01-2119480383-37-xxxx	Flammable liquid, Category 3, H226 Acute toxicity, Category 4, H302 Acute toxicity, Category 4, H332 Acute toxicity, Category 3, H311 Skin corrosion, Category 1B, H314 Respiratory sensitisation, Category 1, H334 Skin sensitisation, Category 1, H317 Chronic aquatic toxicity, Category 3, H412
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For the full text of the H-Statements mentioned in this Section, see Section 16.

### 3.2 Mixture

Not applicable

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## SECTION 4. First aid measures

### 4.1 Description of first aid measures

*General advice*

First aider needs to protect himself.

After inhalation: fresh air. Call in physician.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

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

Irritation and corrosion, Allergic reactions, Cough, Shortness of breath

Risk of blindness!

## 4.3 Indication of any immediate medical attention and special treatment needed

No information available.

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## SECTION 5. Firefighting measures

### 5.1 Extinguishing media

*Suitable extinguishing media*

Water, Foam, Carbon dioxide (CO<sub>2</sub>), Dry powder

*Unsuitable extinguishing media*

For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture

Combustible.

Vapours are heavier than air and may spread along floors.

Forms explosive mixtures with air at elevated temperatures.

Development of hazardous combustion gases or vapours possible in the event of fire.

Fire may cause evolution of:

nitrous gases, Hydrogen cyanide (hydrocyanic acid), nitrogen oxides

### 5.3 Advice for firefighters

*Special protective equipment for firefighters*

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

## *Further information*

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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## **SECTION 6. Accidental release measures**

### **6.1 Personal precautions, protective equipment and emergency procedures**

Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

### **6.2 Environmental precautions**

Do not let product enter drains. Risk of explosion.

### **6.3 Methods and materials for containment and cleaning up**

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

### **6.4 Reference to other sections**

Indications about waste treatment see section 13.

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## **SECTION 7. Handling and storage**

### **7.1 Precautions for safe handling**

#### *Advice on safe handling*

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Observe label precautions.

#### *Advice on protection against fire and explosion*

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

## *Hygiene measures*

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

## **7.2 Conditions for safe storage, including any incompatibilities**

### *Requirements for storage areas and containers*

Do not use light-weight-metal containers.

### *Storage conditions*

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorised persons.

Recommended storage temperature see product label.

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

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

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## **SECTION 8. Exposure controls/personal protection**

### **8.1 Control parameters**

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 800947  
Product name Ethylenediamine for synthesis

---

## Derived No Effect Level (DNEL)

Worker DNEL, longterm	Systemic effects	dermal	3,6 mg/kg Body weight
Worker DNEL, longterm	Systemic effects	inhalation	25 mg/m <sup>3</sup>

## Predicted No Effect Concentration (PNEC)

PNEC Fresh water	0,016 mg/l
PNEC Marine water	0,002 mg/l
PNEC Fresh water sediment	7,68 mg/kg
PNEC Marine sediment	0,768 mg/kg
PNEC Soil	4,36 mg/kg
PNEC Sewage treatment plant	0,5 mg/l

## 8.2 Exposure controls

### Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

### Individual protection measures

Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

#### *Eye/face protection*

Tightly fitting safety goggles

#### *Hand protection*

full contact:

Glove material:	butyl-rubber
Glove thickness:	0,7 mm



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

Break through time:	> 480 min
splash contact:	
Glove material:	polychloroprene
Glove thickness:	0,65 mm
Break through time:	> 240 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 720 Camapren® (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet<(>,<)> supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://www.kcl.de)).

#### *Other protective equipment*

Flame retardant antistatic protective clothing.

#### *Respiratory protection*

required when vapours/aerosols are generated.

Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

#### **Environmental exposure controls**

Do not let product enter drains.

Risk of explosion.

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## **SECTION 9. Physical and chemical properties**

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

Form	liquid
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# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

Colour	colourless
Odour	amine-like
Odour Threshold	No information available.
pH	12,2 at 100 g/l 20 °C
Melting point	11 °C
Boiling point/boiling range	117,1 °C at 1.013 hPa
Flash point	38 °C Method: c.c.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	2 %(V)
Upper explosion limit	17 %(V)
Vapour pressure	12 hPa at 20 °C
Relative vapour density	2,1
Density	0,897 g/cm <sup>3</sup> at 20 °C

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

Relative density	No information available.
Water solubility	at 20 °C soluble
Partition coefficient: n-octanol/water	log Pow: -2,04 (experimental) Bioaccumulation is not expected. (Lit.)
Auto-ignition temperature	405 °C Method: DIN 51794
Decomposition temperature	> 120 °C
Viscosity, dynamic	17 mPa.s at 20 °C
Explosive properties	Not classified as explosive.
Oxidizing properties	none

## 9.2 Other data

Ignition temperature	405 °C Method: DIN 51794
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## SECTION 10. Stability and reactivity

### 10.1 Reactivity

Vapour/air-mixtures are explosive at intense warming.

### 10.2 Chemical stability

Sensitive to air.

### 10.3 Possibility of hazardous reactions

Violent reactions possible with:

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

acid halides, perchlorates, Acrolein, Halogenated hydrocarbon, Acid chlorides, Alcohols,  
Aldehydes, phosphorus halides

Exothermic reaction with:

chlorosulfonic acid, Hydrogen chloride gas, acetic acid, Acetic anhydride, fuming sulfuric acid,  
Oxidizing agents, acryl aldehyde, acids, carbon disulfide, silver perchlorate, vinyl acetate, acrylic  
acid, 1-chloro-2,3-epoxypropane

Risk of explosion with:

Nitromethane, with, Tetryl (N-Methyl-N-2,4,6-tetranitroaniline)

nitric acid (conc.)

Caution! In contact with nitrites, nitrates, nitrous acid possible liberation of nitrosamines!

## 10.4 Conditions to avoid

Heating.

## 10.5 Incompatible materials

Aluminium, Lead, magnesium, Zinc, zinc alloys, Copper, Copper alloys, Iron, brass, bronze

## 10.6 Hazardous decomposition products

in the event of fire: See section 5.

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## SECTION 11. Toxicological information

### 11.1 Information on toxicological effects

#### *Acute oral toxicity*

LD50 Rat: 866 mg/kg

OECD Test Guideline 401

Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation  
of the oesophagus and the stomach.

#### *Acute inhalation toxicity*

LC50 Rat: > 10 - 20 mg/l; 4 h ; vapour

(External MSDS)

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 800947

Product name Ethylenediamine for synthesis

---

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Inhalation may lead to the formation of oedemas in the respiratory tract.

## *Acute dermal toxicity*

LD50 Rabbit: 560 mg/kg

(ECHA)

## *Skin irritation*

Rabbit

Result: Corrosive

(ECHA)

Causes poorly healing wounds.

Causes burns.

## *Eye irritation*

Rabbit

Result: Corrosive

(ECHA)

Causes serious eye damage.

Risk of blindness!

## *Sensitisation*

human

Result: May cause sensitisation by inhalation.

(ECHA)

May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Maximisation Test Guinea pig

Result: positive

(ECHA)

May cause an allergic skin reaction.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

## *Germ cell mutagenicity*

### *Genotoxicity in vitro*

Mutagenicity (mammal cell test):

Result: negative

(ECHA)

## *Carcinogenicity*

This information is not available.

## *Reproductive toxicity*

This information is not available.

## *Teratogenicity*

This information is not available.

## *Specific target organ toxicity - single exposure*

This information is not available.

## *Specific target organ toxicity - repeated exposure*

This information is not available.

## *Aspiration hazard*

This information is not available.

## **11.2 Further information**

After absorption:

Damage to:

Liver, Kidney

Under given conditions, contact with nitrites or nitric acid can lead to the formation of nitrosamines, which have shown themselves to be carcinogenic in animal experiments.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

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## **SECTION 12. Ecological information**

### **12.1 Toxicity**

#### *Toxicity to fish*

semi-static test LC50 *Poecilia reticulata* (guppy): 640 mg/l; 96 h

Directive 67/548/EEC, Annex V, C.1.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

## *Toxicity to daphnia and other aquatic invertebrates*

static test EC50 Daphnia magna (Water flea): 16,7 mg/l; 48 h

Directive 67/548/EEC, Annex V, C.2.

## *Toxicity to algae*

static test ErC50 Pseudokirchneriella subcapitata (algae): 645 mg/l; 72 h

Directive 67/548/EEC, Annex V, C.3.

## *Toxicity to bacteria*

static test EC50 activated sludge: 1.600 mg/l; 0,5 h

OECD Test Guideline 209

static test EC50 Bacteria: 3,2 mg/l; 2 h

(ECHA)

## *Toxicity to fish (Chronic toxicity)*

semi-static test NOEC Fish: > 10 mg/l; 28 d

OECD Test Guideline 210

## *Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)*

semi-static test NOEC Daphnia magna (Water flea): 0,16 mg/l; 21 d

Analytical monitoring: yes

US-EPA

## **12.2 Persistence and degradability**

### *Biodegradability*

93 - 95 %; 28 d

OECD Test Guideline 301C

Readily biodegradable

95 %; 28 d; aerobic

C.4-E of the COUNCIL REGULATION (EC) No 440/2008

Readily biodegradable

## **12.3 Bioaccumulative potential**

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 800947  
Product name Ethylenediamine for synthesis

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*Partition coefficient: n-octanol/water*

log Pow: -2,04  
(experimental)

Bioaccumulation is not expected. (Lit.)

## 12.4 Mobility in soil

No information available.

## 12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

## 12.6 Other adverse effects

Discharge into the environment must be avoided.

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## SECTION 13. Disposal considerations

*Waste treatment methods*

See [www.retrologistik.com](http://www.retrologistik.com) for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

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## SECTION 14. Transport information

### Land transport (ADR/RID)

14.1 UN number	UN 1604
14.2 Proper shipping name	ETHYLENEDIAMINE
14.3 Class	8 (3)
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes
Tunnel restriction code	D/E

### Inland waterway transport (ADN)

Not relevant

### Air transport (IATA)



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

14.1 UN number	UN 1604
14.2 Proper shipping name	ETHYLENEDIAMINE
14.3 Class	8 (3)
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	no

## Sea transport (IMDG)

14.1 UN number	UN 1604
14.2 Proper shipping name	ETHYLENEDIAMINE
14.3 Class	8 (3)
14.4 Packing group	II
14.5 Environmentally hazardous	--
14.6 Special precautions for user	yes

EmS	F-E S-C
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14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant

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## SECTION 15. Regulatory information

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

#### *EU regulations*

Major Accident Hazard	SEVESO III
Legislation	FLAMMABLE LIQUIDS
	P5c
	Quantity 1: 5.000 t
	Quantity 2: 50.000 t

Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.
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# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer not regulated

Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC not regulated

Substances of very high concern (SVHC) This product does contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 59 above the respective regulatory concentration limit of > 0.1 % (w/w).

Contains: ethylenediamine

*National legislation*

Storage class 3

## 15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

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## 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.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H412	Harmful to aquatic life with long lasting effects.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No. 800947

Product name Ethylenediamine for synthesis

---

## Training advice

Provide adequate information, instruction and training for operators.

## Labelling

*Hazard pictograms*



*Signal word*

Danger

*Hazard statements*

H226 Flammable liquid and vapour.

H302 + H332 Harmful if swallowed or if inhaled.

H311 Toxic in contact with skin.

H314 Causes severe skin burns and eye damage.

H317 May cause an allergic skin reaction.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H412 Harmful to aquatic life with long lasting effects.

*Precautionary statements*

Prevention

P210 Keep away from heat.

P273 Avoid release to the environment.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position 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.

P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Catalogue No.	800947
Product name	Ethylenediamine for synthesis

---

Contains: ethylenediamine

## Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at [www.wikipedia.org](http://www.wikipedia.org).

## Regional representation

This information is given on the authorised Safety Data Sheet for your country.

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*The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.*