

## SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 04.11.2010

Version 7.7

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

#### 1.1 Product identifier

Catalogue No.	820030
Product name	Ethylenediamine monohydrate for synthesis
REACH Registration Number	A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

#### 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.merck-chemicals.com">www.merck-chemicals.com</a> ).
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#### 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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### 2. Hazards identification

#### 2.1 Classification of the substance or mixture

##### Classification (REGULATION (EC) No 1272/2008)

Flammable liquid, Category 3, H226  
Acute toxicity, Category 4, Dermal, H312  
Acute toxicity, Category 4, Oral, H302  
Skin corrosion, Category 1B, H314  
Respiratory sensitization, Category 1, H334  
Skin sensitization, Category 1, H317

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

##### Classification (67/548/EEC or 1999/45/EC)

R10  
C; R34  
Xn; R21/22  
R42/43

For the full text of the R-phrases mentioned in this Section, see Section 16.

#### 2.2 Label elements

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

##### Hazard pictograms



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*Signal word*

Danger

*Hazard statements*

H226 Flammable liquid and vapour.

H302 + H312 Harmful if swallowed or in contact with skin.

H314 Causes severe skin burns and eye damage.

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

H317 May cause an allergic skin reaction.

*Precautionary statements*

P210 Keep away from heat.

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

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

P304 + P341 IF INHALED: If breathing is difficult, 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.

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

P309 + P310 IF exposed or if you feel unwell: Immediately call a POISON CENTER or doctor/physician.

**Reduced labelling (≤125 ml)**

*Hazard pictograms*



*Signal word*

Danger

*Hazard statements*

H314 Causes severe skin burns and eye damage.

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

H317 May cause an allergic skin reaction.

*Precautionary statements*

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

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

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

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

P309 + P310 IF exposed or if you feel unwell: Immediately call a POISON CENTER or doctor/physician.

*Index-No.* 612-006-00-6

**Labelling (67/548/EEC or 1999/45/EC)**

Symbol(s)	C	Corrosive
R-phrases(s)	10-21/22-34-42/43	Flammable. Harmful in contact with skin and if swallowed. Causes burns. May cause sensitization by inhalation and skin contact.
S-phrases(s)	23-26-36/37/39-45	Do not breathe vapour. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves and eye/face protection. In case of accident or if you feel unwell, seek

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medical advice immediately (show the label where possible).

EC-No. 203-468-6 EC Label

### 2.3 Other hazards

None known.

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### 3. Composition/information on ingredients

Formula	$\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2 \cdot \text{H}_2\text{O}$	$\text{C}_2\text{H}_8\text{N}_2 \cdot \text{H}_2\text{O}$ (Hill)
CAS-No.	6780-13-8	
Index-No.	612-006-00-6	
EC-No.	203-468-6	
Molar mass	78,11 g/mol	

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### 4. First aid measures

#### 4.1 Description of first aid measures

After inhalation: fresh air. Call in physician.

After skin contact: wash off with plenty of water. Swab with polyethylene glycol 400. Immediately remove contaminated clothing. 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, irritant effects, Allergic reactions, Cough, Shortness of breath  
Risk of blindness!

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

No information available.

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### 5. Fire-fighting measures

#### 5.1 Extinguishing media

*Suitable extinguishing media*

Carbon dioxide ( $\text{CO}_2$ ), Foam, 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 material

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:

nitrogen oxides

#### 5.3 Advice for firefighters

*Special protective equipment for fire-fighters*

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

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*Further information*

Cool closed containers exposed to fire with water spray. 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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**6. Accidental release measures**

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

Advice for non-emergency personnel: Avoid substance contact. Do not breathe vapours, aerosols. Ensure adequate ventilation. 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 empty into 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 7.2 and 10.5).

Take up with liquid-absorbent and neutralising material (e.g. Chemisorb® OH<sup>-</sup>, Merck Art. No. 101596). Dispose of properly. Clean up affected area.

**6.4 Reference to other sections**

Indications about waste treatment see section 13.

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**7. Handling and storage**

**7.1 Precautions for safe handling**

Work under hood. Do not inhale substance. 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.

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

Keep away from heat and sources of ignition. Keep container tightly closed in a dry and well-ventilated place.

Store at +15°C to +25°C.

**7.3 Specific end uses**

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

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**8. Exposure controls/personal protection**

**8.1 Control parameters**

**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.

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**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.

*Hygiene measures*

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance. Work under hood. Do not inhale substance.

*Eye/face protection*

Tightly fitting safety goggles

*Hand protection*

full contact:

Glove material:	butyl-rubber
Glove thickness:	0,7 mm
Break through time:	> 480 min

splash contact:

Glove material:	natural latex
Glove thickness:	0,6 mm
Break through time:	> 120 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 706 Lapren® (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 empty into drains.

Risk of explosion.

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**9. Physical and chemical properties**

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

Form	liquid
Colour	colourless
Odour	amine-like

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Odour Threshold	No information available.
pH	12 at 100 g/l 20 °C
Melting point	8 - 10 °C
Boiling point/boiling range	118 °C at 1.013 hPa
Flash point	42 °C
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	2,7 %(V)
Upper explosion limit	16,6 %(V)
Vapour pressure	12 hPa at 20 °C
Relative vapour density	No information available.
Relative density	0,963 g/cm <sup>3</sup> at 20 °C
Water solubility	at 20 °C soluble
Partition coefficient: n-octanol/water	log Pow: -2,04 Method: (experimental) (anhydrous substance) (Lit.)  Bioaccumulation is not expected (log Pow <1).
Autoignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	1,6 mPa.s at 20 °C
Explosive properties	No information available.
Oxidizing properties	No information available.
<b>9.2 Other data</b>	
Ignition temperature	385 °C

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## 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

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

Violent reactions possible with:

acid halides, Oxidizing agents, perchlorates, Acetic anhydride, fuming sulfuric acid, Acrolein, carbon disulfide, vinyl acetate, Halogenated hydrocarbon, acids

### 10.4 Conditions to avoid

Heating.

A range from approx. 15 Kelvin below the flash point is to be rated as critical.

### 10.5 Incompatible materials

Aluminium, Lead, Copper, magnesium, Zinc, zinc alloys

### 10.6 Hazardous decomposition products

in the event of fire: See chapter 5.

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## 11. Toxicological information

### 11.1 Information on toxicological effects

#### *Acute oral toxicity*

LD50 rat

Dose: 866 mg/kg

(anhydrous substance) (External MSDS)

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

absorption

#### *Acute inhalation toxicity*

LC50 rat

Dose: > 20 mg/l, 4 h

(anhydrous substance) (External MSDS)

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages: damage of respiratory tract

#### *Acute dermal toxicity*

LD50 rabbit

Dose: 560 mg/kg

(Lit.) anhydrous substance

absorption

#### *Skin irritation*

rabbit

Result: Causes burns.

(anhydrous substance) (External MSDS)

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Causes severe burns.

*Eye irritation*

rabbit

Result: Causes burns.

(anhydrous substance) (IUCLD)

Causes serious eye damage.

Risk of blindness!

*Sensitisation*

Sensitisation test: guinea pig

Result: positive

(anhydrous substance) (IUCLD)

May cause an allergic skin reaction.

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

*Specific target organ toxicity - single exposure*

The substance or mixture is not classified as specific target organ toxicant, single exposure.

*Specific target organ toxicity - repeated exposure*

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

*Aspiration hazard*

No aspiration toxicity classification

## 11.2 Further information

*Further information*

If swallowed

Damage to:

Liver, Kidney

Other information

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.

Further data:

Handle in accordance with good industrial hygiene and safety practice.

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## 12. Ecological information

### 12.1 Toxicity

*Toxicity to fish*

LC50

Species: Poecilia reticulata (guppy)

Dose: 275 mg/l

Exposure time: 96 h

Method: OECD Test Guideline 203

(anhydrous substance)

*Toxicity to daphnia and other aquatic invertebrates.*

EC50

Species: Daphnia magna (Water flea)

Dose: 3 mg/l

Exposure time: 48 h

Method: OECD Test Guideline 202

(anhydrous substance)



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*Toxicity to algae*

IC50

Species: chlorella pyrenoidosa

Dose: 100 mg/l

Exposure time: 96 h

Method: OECD Test Guideline 201

(anhydrous substance)

*Toxicity to bacteria*

EC50

Species: activated sludge

Dose: 1.600 mg/l

Exposure time: 1 h

Method: OECD Test Guideline 209

(anhydrous substance)

**12.2 Persistence and degradability**

*Biodegradability*

Result: Readily biodegradable.

93 - 95 %

Exposure time: 28 d

Method: OECD Test Guideline 301C

(anhydrous substance)

**12.3 Bioaccumulative potential**

*Partition coefficient: n-octanol/water*

log Pow: -2,04

Method: (experimental)

(anhydrous substance) (Lit.)

Bioaccumulation is not expected (log Pow <1).

**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**

*Additional ecological information*

Do not allow to run into surface waters, wastewater, or soil.

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**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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**14. Transport information**

**ADR/RID**

UN 1604 ETHYLENEDIAMINE, 8 (3), II

**IATA**

UN 1604 ETHYLENEDIAMINE, 8 (3), II

**IMDG**

UN 1604 ETHYLENEDIAMINE, 8 (3), II

EmS F-E S-C

The transport regulations are cited according to international regulations and in the form

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applicable in Germany. Possible national deviations in other countries are not considered.

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## 15. Regulatory information

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

#### *EU regulations*

Major Accident Hazard	96/82/EC
Legislation	Flammable. 6 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. Take note of Dir 92/85/EEC on the safety and health at work of pregnant workers.

#### *National legislation*

Storage class VCI	3 Flammable Liquids
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### 15.2 Chemical Safety Assessment

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

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## 16. Other information

### Full text of H-Statements referred to under sections 2 and 3.

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H312	Harmful 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.

### Full text of R-phrases referred to under sections 2 and 3

R10	Flammable.
R21/22	Harmful in contact with skin and if swallowed.
R34	Causes burns.
R42/43	May cause sensitization by inhalation and skin contact.

### Training advice

Provide adequate information, instruction and training for operators.

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

### 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).

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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.*