

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision Date 04.02.2020

Version 8.1

SECTION 1. Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier**

| | |
|---------------------------|---------------------------------------------------------------------|
| Catalogue No. | 820610 |
| Product name | Glyoxal (40% solution in water) for synthesis |
| REACH Registration Number | This product is a mixture. REACH Registration Number see section 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 (www.merckgroup.com). |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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: prodsafe@merckgroup.com |

1.4 Emergency telephone number **Please contact the regional company representation in your country.****SECTION 2. Hazards identification****2.1 Classification of the substance or mixture**
Classification (REGULATION (EC) No 1272/2008)

Skin irritation, Category 2, H315
Eye irritation, Category 2, H319
Skin sensitisation, Category 1, H317
Germ cell mutagenicity, Category 2, H341

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

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Product name

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Glyoxal (40% solution in water) for synthesis

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms



Signal word

Warning

Hazard statements

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation.

H341 Suspected of causing genetic defects.

Precautionary statements

Prevention

P280 Wear protective gloves.

Response

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 + P313 IF exposed or concerned: Get medical advice/ attention.

Reduced labelling (≤ 125 ml)

Hazard pictograms



Signal word

Warning

Hazard statements

H317 May cause an allergic skin reaction.

H341 Suspected of causing genetic defects.

Precautionary statements

P280 Wear protective gloves.

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

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

Chemical nature

Aqueous solution

3.1 Substance

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Not applicable

3.2 Mixture

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

Chemical name (Concentration)

| CAS-No. | Registration number | Classification |
|---------|---------------------|----------------|
|---------|---------------------|----------------|

glyoxal ($\geq 25\%$ - $< 50\%$)

107-22-2 *)

Acute toxicity, Category 4, H332
Skin irritation, Category 2, H315
Eye irritation, Category 2, H319
Skin sensitisation, Category 1, H317
Germ cell mutagenicity, Category 2, H341

ethylene glycol ($\geq 1\%$ - $< 10\%$)

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

| | |
|----------|-----------------------|
| 107-21-1 | 01-2119456816-28-XXXX |
|----------|-----------------------|

Acute toxicity, Category 4, H302
Specific target organ toxicity - repeated exposure, Category 2, H373

*) 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.

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

SECTION 4. First aid measures

4.1 Description of first aid measures

After inhalation: fresh air. Call in physician.

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

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

agitation, spasms, Nausea, Tiredness
irritant effects, Allergic reactions

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 (CO₂), 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

Mixture with combustible ingredients.

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

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.

Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

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. 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.

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 with liquid-absorbent and neutralising material (e.g. Chemizorb® H⁺, Merck Art. No. 101595). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Observe label precautions.

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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

Storage conditions

Tightly closed.

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.

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL)

ethylene glycol (107-21-1)

| | | | |
|-------------------------|------------------|------------|-----------------------|
| Worker DNEL, longterm | Systemic effects | dermal | 106 mg/kg Body weight |
| Worker DNEL, longterm | Local effects | inhalation | 35 mg/m ³ |
| Consumer DNEL, longterm | Systemic effects | dermal | 53 mg/kg Body weight |
| Consumer DNEL, longterm | Local effects | inhalation | 7 mg/m ³ |

Predicted No Effect Concentration (PNEC)

ethylene glycol (107-21-1)

| | |
|-----------------------------------|-------------|
| PNEC Fresh water | 10 mg/l |
| PNEC Marine water | 1 mg/l |
| PNEC Aquatic intermittent release | 10 mg/l |
| PNEC Fresh water sediment | 20,9 mg/kg |
| PNEC Soil | 1,53 mg/kg |
| PNEC Sewage treatment plant | 199,5 mg/kg |

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.

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Product name

Glyoxal (40% solution in water) for synthesis

Eye/face protection

Safety glasses

Hand protection

full contact:

Glove material: Nitrile rubber

Glove thickness: 0,11 mm

Break through time: 480 min

splash contact:

Glove material: Nitrile rubber

Glove thickness: 0,11 mm

Break through time: 480 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 741 Dermatril® L (full contact), KCL 741 Dermatril® L (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).

Other protective equipment

protective clothing

Respiratory protection

required when vapours/aerosols are generated.

Recommended Filter type: filter ABEK

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.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|-----------------|---------------------------|
| Form | liquid |
| Colour | colourless |
| Odour | characteristic |
| Odour Threshold | No information available. |
| pH | 2 - 3 at 20 °C |

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| | |
|----------------------------------------|--------------------------------------------------------------------------------------|
| Melting point | -14 °C |
| Boiling point/boiling range | 104 °C at 1.013 hPa |
| Flash point | No information available. |
| Evaporation rate | No information available. |
| Flammability (solid, gas) | No information available. |
| Lower explosion limit | No information available. |
| Upper explosion limit | No information available. |
| Vapour pressure | 106,7 hPa at 50 °C 20,2 hPa at 20 °C |
| Relative vapour density | No information available. |
| Density | ca.1,27 g/cm ³ at 20 °C |
| Relative density | No information available. |
| Water solubility | at 20 °C soluble |
| Partition coefficient: n-octanol/water | log Pow: -1,15 (experimental) Bioaccumulation is not expected. (External MSDS) |
| Auto-ignition temperature | No information available. |
| Decomposition temperature | No information available. |
| Viscosity, dynamic | 8 mPa.s at 20 °C |
| Explosive properties | Not classified as explosive. |
| Oxidizing properties | none |

9.2 Other data

| | |
|----------------------|---------------------------------|
| Ignition temperature | ca. 285 °C Method: DIN 51794 |
|----------------------|---------------------------------|

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SECTION 10. Stability and reactivity

10.1 Reactivity

See section 10.3

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Violent polymerisation may be caused by:

Ammonia, Amines, alkalines

Exothermic reaction with:

chlorosulfonic acid, Ethyleneimine, Sodium hydroxide, Nitric acid, conc. sulfuric acid

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

Aluminium, Copper, Mild steel

10.6 Hazardous decomposition products

no information available

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Mixture

Acute oral toxicity

Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract., Nausea

LD50 Rat: > 2.000 - < 5.000 mg/kg

(External MSDS)

Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

Acute inhalation toxicity

LC50 Rat: 2,44 mg/l; 4 h ; aerosol

(External MSDS)

Acute toxicity estimate: > 20 mg/l; 4 h ; vapour

Calculation method

Symptoms: Possible symptoms:, mucosal irritations

Acute dermal toxicity

LD50 Rat: > 2.000 mg/kg

(External MSDS)

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Skin irritation

Rabbit

Result: Irritations

OECD Test Guideline 404

Mixture causes skin irritation.

Eye irritation

Rabbit

Result: Irritations

OECD Test Guideline 405

Mixture causes serious eye irritation.

Sensitisation

Sensitisation test (Magnusson and Kligman):

Result: positive

(External MSDS)

Maximisation Test Guinea pig

Result: positive

Method: OECD Test Guideline 406

Mixture may cause an allergic skin reaction.

Germ cell mutagenicity

This information is not available.

Carcinogenicity

This information is not available.

Reproductive toxicity

This information is not available.

Teratogenicity

This information is not available.

CMR effects

Mutagenicity:

Evidence of genetic defects.

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 of large quantities:

Tiredness, agitation, spasms

Possible effects to:

Kidney, Stomach

Other dangerous properties can not be excluded.

Other dangerous properties can not be excluded.

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This substance should be handled with particular care.

Components

glyoxal

Acute inhalation toxicity

Acute toxicity estimate: 11,1 mg/l; vapour

Expert judgement

ethylene glycol

Acute oral toxicity

LDLO human: 786 mg/kg
(RTECS)

Acute inhalation toxicity

LC50 Rat: > 2,5 mg/l; 6 h ; aerosol
(ECHA)

Acute dermal toxicity

LD50 Mouse: > 3.500 mg/kg
(ECHA)

Skin irritation

Rabbit

Result: No irritation

(ECHA)

Eye irritation

Rabbit

Result: No eye irritation

(ECHA)

Sensitisation

Patch test:

Result: negative

(IUCLID)

Germ cell mutagenicity

Genotoxicity in vivo

Chromosome aberration test

Rat

male and female

Oral

Result: negative

(ECHA)

Genotoxicity in vitro

Ames test

Escherichia coli/Salmonella typhimurium

Result: negative

Method: OECD Test Guideline 471

Mutagenicity (mammal cell test): chromosome aberration.

Result: negative

(ECHA)

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Carcinogenicity

Did not show carcinogenic effects in animal experiments.

SECTION 12. Ecological information

Mixture

12.1 Toxicity

Toxicity to fish

LC50 *Leuciscus idus* (Golden orfe): 460 - 680 mg/l; 96 h
(External MSDS)

Toxicity to daphnia and other aquatic invertebrates

EC50 *Daphnia magna* (Water flea): 404 mg/l; 48 h
(External MSDS)

Toxicity to algae

IC50 *Desmodesmus subspicatus* (green algae): > 100 mg/l; 72 h
(External MSDS)

Toxicity to bacteria

EC50 *Pseudomonas putida*: 102 mg/l; 16 h
(External MSDS)

12.2 Persistence and degradability

Biodegradability

90 - 100 %; 28 d
OECD Test Guideline 301A
Readily biodegradable

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: -1,15
(experimental)

Bioaccumulation is not expected. (External MSDS)

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

Substance(s) in the mixture do(es) not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII, or a PBT/vPvB assessment was not conducted.

12.6 Other adverse effects

Additional ecological information

Discharge into the environment must be avoided.

Components

glyoxal

No information available.

ethylene glycol

Toxicity to fish

LC50 *Oncorhynchus mykiss* (rainbow trout): > 18.500 mg/l; 96 h
(External MSDS)

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Toxicity to daphnia and other aquatic invertebrates
static test Daphnia magna (Water flea): > 100 mg/l; 48 h
Analytical monitoring: yes
OECD Test Guideline 202

Toxicity to algae
IC5 Scenedesmus quadricauda (Green algae): > 10.000 mg/l; 7 d
(Lit.)

Toxicity to bacteria
static test EC5 Pseudomonas putida: > 10.000 mg/l; 16 h
DIN 38412

Biodegradability
100 %; 10 d; aerobic
OECD Test Guideline 301A
Readily biodegradable

Biochemical Oxygen Demand (BOD)
780 mg/g (5 d)
(IUCLID)

Chemical Oxygen Demand (COD)
1.190 mg/g
(IUCLID)

Theoretical oxygen demand (ThOD)
1.290 mg/g
(IUCLID)

Ratio BOD/ThBOD
BOD5 60 %
(IUCLID)

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

SECTION 13. Disposal considerations

Waste treatment methods

See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 - 14.6 Not classified as dangerous in the meaning of transport regulations.

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

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14.1 - 14.6

Not classified as dangerous in the meaning of transport regulations.

Sea transport (IMDG)

14.1 - 14.6

Not classified as dangerous in the meaning of transport regulations.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant

SECTION 15. Regulatory information

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

EU regulations

| | |
|-----------------------------------|------------------------------|
| Major Accident Hazard Legislation | SEVESO III Not applicable |
|-----------------------------------|------------------------------|

| | |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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 not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of $\geq 0.1\%$ (w/w). |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

National legislation

| | |
|---------------|---------|
| Storage class | 10 - 13 |
|---------------|---------|

15.2 Chemical safety assessment

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

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| Product name | Glyoxal (40% solution in water) for synthesis |

SECTION 16. Other information

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

| | |
|------|---------------------------------------------------------------------------------|
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H317 | May cause an allergic skin reaction. |
| H319 | Causes serious eye irritation. |
| H332 | Harmful if inhaled. |
| H341 | Suspected of causing genetic defects. |
| H373 | May cause damage to organs through prolonged or repeated exposure if swallowed. |

Training advice

Provide adequate information, instruction and training for operators.

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.

Regional representation

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

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.

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