Vaillant GmbH Berghauserstr. 40 42850 Remscheid Deutschland (Niemcy)

Dział/znak	Nazwa/e-mail	Telefon/faks	Data	Strona
VGQ-SC	Chris Hertgers	02191/18-0	13.10.2014	1 / 1

Potwierdzenie identyczności nośników ciepła

Szanowni Państwo,

niniejszym potwierdzamy, że wymienione poniżej nośniki ciepła firmy Vaillant GmbH są identyczne pod względem zawartości z nośnikami ciepła firmy TYFOROP Chemie GmbH.

Nośniki ciepła firmy Vaillant GmbH **Numer artykułu Vaillant**	**identyczne pod względem zawartości z**	**nośnikami ciepła firmy TYFOROP Chemie GmbH**
Gotowa mieszanka płynu solankowego 20 l 0020096232	-	TYFOCOR® Gotowa mieszanka 44,3 obj. %, ochrona przed niskimi temperaturami -30 °C
Gotowa mieszanka płynu solankowego 30 l 0020147182	-	TYFOCOR® Gotowa mieszanka 30,0 obj. %, ochrona przed niskimi temperaturami -16.1 °C
Koncentrat płynu solankowego 20 l 0020147185	-	TYFOCOR®
Koncentrat płynu solankowego 5 l 0020147186	-	TYFOCOR®

Firmy Vaillant z up. Marc Imann
starszy specjalista ds. certyfikacji

TYFOROP Chemie GmbH
dr Frank Hillerns, kierownik działu badań i rozwoju

SECTION 1. Identification of the Substance / Mixture and of the Company

Product identifier: **TYFOCOR®**
ready mix 44.3 vol. %, freezing point -30.0 °C

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

Relevant identified uses: Antifreeze and anti-corrosion fluid for thermotechnical systems

Details of the supplier of the safety data sheet

Identification of the company: TYFOROP Chemie GmbH, Anton-Rée-Weg 7, D - 20537 Hamburg
Tel.: +49 (0)40 -20 94 97-0, Fax: -20 94 97-20, e-mail: info@tyfo.de

Information about the product: E-mail (competent person): msds@tyfo.de

Emergency information: Tel.: +49 (0)551-19240 GIZ-Nord Poison Center

SECTION 2. Hazards identification

Classification of the substance or mixture

According to EC Directive 67/548/EEC or 1999/45/EC

Hazard symbol: Xn Harmful.
R-phrases: R22 Harmful if swallowed.

According to Regulation (EC) No. 1272/2008 [CLP/GHS]

Hazard classes/categories	Hazard Statements	
Acute Tox. Cat. 4	H302	Harmful if swallowed.
STOT RE Cat. 2	H373	May cause damage to organs (kidney) through prolonged or repeated exposure.

Label elements

According to Directive 67/548/EEC or 1999/45/EC ('Preparations Directive')

Advice on labelling: The product is subject to labelling. The classification was carried out according to the calculation procedure of the Preparations Directive (1999/45/EC).

Hazard symbol
Xn Harmful.

R-phrases
R22 Harmful if swallowed.

S-phrases
S2 Keep out of reach of children.
S24/25 Avoid contact with skin and eyes.
S46 If swallowed, seek medical advice immediately and show this container or label.

Hazard determinant component for labelling: Ethane-1,2-diol/ethylene glycol.

According to Regulation (EC) No. 1272/2008 [CLP/GHS]

Signal word: Warning.

GHS07

Hazard Statement
H302 Harmful if swallowed.
H373 May cause damage to organs (kidney) through prolonged or repeated exposure.

Precautionary Statements (Prevention)
P260 Do not breathe vapour/mist/aerosol.
P264 Wash with plenty of water and soap thorougly after handling.
P270 Do not eat, drink or smoke when using this product.

GHS08

Precautionary Statements (Response)
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P301+P330 IF SWALLOWED: rinse mouth.

Precautionary Statements (Disposal)
P501 Dispose of contents/container to hazardous or special waste collection point.

Hazard determinant component for labelling: Ethane-1,2-diol/ethylene glycol.

Other hazards: According to Regulation (EC) No. 1272/2008 [CLP]: No other hazards known.

SECTION 3. Composition / Information on Ingredients

Chemical nature: Ethane-1,2-diol (ethylene glycol). Inhibitors.

Hazardous ingredients according to Directive 1999/45/EC and Regulation 1272/2008/EC

Substance	Dir. 1999/45/EC	Reg. 1272/2008/EC [CLP/GHS]
Ethane-1,2-diol/ethylene glycol	Hazard symbol: Xn	Acute Tox. Cat. 4, H302
Content (w/w): <45 %	R-phrases: R22	STOT RE Cat. 2, H373
CAS Number: 107-21-1		
EC Number: 203-473-3		
INDEX Number: 603-027-00-1		
REACH Registration Number: 01-2119456816-28		

For the classifications not written out in full in this section, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, the full text is listed in section 16.

SECTION 4. First-Aid Measures

Description of first aid measures

General advice: Remove contaminated clothing.

If inhaled: If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact: Wash thoroughly with soap and water.

On contact with eyes: Wash affected eyes for at least 15 minutes under running water with eyelids held open.

On ingestion: Rinse mouth immediately and then drink plenty of water, seek medical attention. Administer 50 ml of pure ethanol in a drinkable concentration.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling of the product (see section 2) and/or in section 11. Further important symptoms and effects are so far not known.

Indication of any immediate medical attention and special treatment needed

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media: The product is non-flammable. Water spray, dry powder, and alcohol-resistant foam are suitable for extinguishing environmental fire.

Special hazards arising from the substance or mixture

Harmful vapours. Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

Advice for fire-fighters

Special protective equipment: Wear a self-contained breathing apparatus.

Further information

The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

SECTION 6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Use personal protective clothing.

Environmental precautions

Contain contaminated water/firefighting water. Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

For large amounts: Pump off product. Pick up residues with suitable absorbent material. Dispose of absorbed material in accordance with official regulations.

Additional information: High risk of slipping due to leakage/spillage of product.

SECTION 6. Accidental Release Measures - Continuation

Reference to other sections

Information regarding exposure controls / personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7. Handling and Storage

Precautions for safe handling

Advice on safe handling: Do not breathe vapour/mist/aerosol. Avoid contact with skin and eyes. No special precautions necessary.

Advice on protection against fire/explosion: Observe the general rules of industrial fire protection. No special precautions necessary.

Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels: Store containers tightly sealed in a cool, dry and well ventilated place.

Advice on storage compatibility: Do not store with strong oxidizing agents. Keep away from food, beverages and animal feedstuffs.

Specific end uses

For the relevant identified uses listed in section 1 the advice mentioned in this section 7 is to be observed.

SECTION 8. Exposure Control / Personal Protection

Control parameters

Components with occupational exposure limits

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Regulatory basis / Revision	Type of exposure limit value	Value / Remark
EH40/2005 Workplace Exposure Limits, UK	Long-term (8-hr TWA) Long-term (8-hr TWA) Short-term (15 minutes)	10 mg/m^3 / particulate, skin 52 mg/m^3; 20 ppm / vapour 104 mg/m^3; 40 ppm / vapour
Directive 2000/39/EC, 2000-06-16	Long-term (8-hr TWA) Short-term (15 minutes)	52 mg/m^3; 20 ppm 104 mg/m^3; 40 ppm

DNEL Values

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Route of exposure / Personnel	Duration of exposure / effect	Value
Skin / Workers	Long-term / systemic effects	106 mg/kg body weight/day
Inhalation / Workers	Long-term / local effects	35 mg/m^3
Skin / Consumers	Long-term / systemic effects	53 mg/kg body weight/day
Inhalation / Consumers	Long-term / local effects	7 mg/m^3

PNEC Values

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Environmental compartment	Value
Water (fresh water)	10 mg/l
Water (sea water)	1 mg/l
Water (intermittent release)	10 mg/l
Sediment (fresh water)	20.9 mg/kg sediment
Soil	1.53 mg/kg soil
Sewage treatment plant	199.5 mg/l

Exposure controls

Personal protective equipment

Respiratory protection: Suitable respiratory protection at higher concentrations or long-term effect. Gas filter for gases/vapours of organic compounds (b.p. >65 °C, e.g. EN 14387, type A).

Hand protection: Chemical resistant protective gloves (EN 374). Suitable materials also with prolonged, direct contact (recommended: Protective index 6, corresp. >480 minutes of permeation time according to EN 374), e.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), polyvinylchloride (0.7 mm) and other. Supple-

SECTION 8. Exposure Control / Personal Protection - Continuation

	mentary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing. Manufacturer's directions for use should be observed because of great diversity of types.
Eye protection:	Safety glasses with side-shields (frame goggles) (e.g. EN 166).
General safety and hygiene measures:	Do not breathe vapour/mist/aerosol. Avoid contact with skin and eyes. Handle in accordance with good industrial hygiene and safety practice. Wearing of closed work clothing is recommended.

SECTION 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	liquid.	
Colour:	green.	
Odour:	product specific.	
pH value (20 °C):	7.5 - 8.5.	(ASTM D 1287)
Freezing point:	approx. -30.0 °C	(ASTM D 1177)
Solidification temperature:	approx. -36.4 °C.	(DIN/ISO 3016)
Boiling point:	>100 °C.	(ASTM D 1120)
Flash point:	not applicable.	(DIN EN 22719, ISO 2719)
Flammability:	not flammable.	
Lower explosion limit:	3.2 % vol.	(Data for ethylene glycol)
Upper explosion limit:	15.0 % vol.	(Data for ethylene glycol)
Ignition temperature:	not applicable.	(DIN 51794)
Vapour pressure (20 °C):	approx. 20 hPa.	
Density (20 °C):	approx. 1.065 g/cm^3.	(DIN 51757)
Solubility (qualitative) solvents:	polar solvents: soluble.	
Partitioning coefficient n-octanol/water (log P_{ow}):	-1.36.	(Data for ethylene glycol)
Self ignition:	not self igniting.	
Viscosity (kinematic, 20 °C):	approx. 3.6 mm^2/s.	(DIN 51562)
Explosion hazard:	not explosive.	
Fire promoting properties:	not fire-propagating.	

Other Information

Miscibility with water:	miscible in all proportions.

SECTION 10. Stability and Reactivity

Reactivity:	No hazardous reactions if stored and handled as prescribed/indicated. Corrosion to metals: No corrosive effect on metals.
Chemical stability:	The product is stable if stored and handled as prescribed/indicated.
Possibility of hazardous reactions:	No hazardous reactions if stored and handled as prescribed/indicated.
Conditions to avoid:	No conditions to avoid anticipated.
Incompatible materials:	Substances to avoid: strong oxidising agents.
Hazardous decomposition products:	No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION 11. Toxicological Information

Information on toxicological effects

Acute toxicity / Irritation / Sensitization

Parameter	Value / Evaluation	Species	Remark
LD50 acute oral	>2000 mg/kg	Rat	Data relate to main component
LD50 acute dermal	>2000 mg/kg	Rabbit	Data relate to main component
Irritant effect on skin	non-irritant	Rabbit	Data relate to main component
Irritant effect on eye	non-irritant	Rabbit	Data relate to main component
Sensitization	non-sensitizing	Guinea pig	Data relate to main component

SECTION 11. Toxicological Information - Continuation

Repeated dose toxcity: Sub-acute oral toxicity: NOAEL 200 mg/kg, rat (male/female), OECD 407. Subchronic oral toxicity (feed): NOAEL 150 mg/kg, rat (male), OECD 408. Data relate to main component.

Assessment of mutagenicity: Based on evaluation of several tests the product is evaluated as not being mutagenic. Data relate to main component.

Assessment of toxicity to reproduction: No indications of toxic effects were observed in reproduction studies in animals. Data relate to main component.

Assessment of carcinogenicity: No indications of carcinogenic effects are available from longterm trials. Data relate to main component

Experiences made from practice: Information on Ethane-1,2-diol: **1.** Effects on central nervous system (CNS) and gastrointestinal tract (nausea, vomiting, dizziness, reflex inhibition, epileptiform seizures, convulsions, coma, respiratory arrest, circulatory collapse) within 30 min to 12 h. **2.** Effects on cardiac and pulmonary function (acceleration of pulse and breathing, increased blood pressure, possibly inflammatory mucosal changes, pulmonary edema, congestive heart failure) within 12-24 h. **3.** Renal impairment (oliguria to anuria, degeneration of the kidney tissue with oxalate crystal deposits) within 24-72 h. **4.** Degeneration of the central nervous system (double-sided facial paralysis, pupillary inequality, blurred vision, dysphagia, hyperreflexia, incoordination, cerebral oedema, deposit of calcium oxalate in the brain) within 6-14 days. Experimental/calculated data: Mean lethal dose: 1.2-1.5 g/kg, oral, adults. The symptoms/diagnosis/findings mentioned may result with smaller doses.

Other information on toxicity: The product has not been tested. The statements on toxicology refer to the main component. Information on Ethane-1,2-diol: A risk of teratogenicity is not to be feared if the WEL values are adhered to. Risk of skin resorption. The whole of the information available provides no indication of a carcinogenic effect. The product was classified according to the calculation procedure of the Preparations Directive (1999/45/EC).

SECTION 12. Ecological Information

Toxicity

Toxicity to	Value	Species	Remark
Fish	LC50 (96 h): >100 mg/l	Leuciscus idus	-
Aquatic invertebrates	EC50 (48 h): >100 mg/l	Daphnia magna	-
Aquatic plants	EC50 (72 h): >100 mg/l	Algae	-
Microorganisms	>1000 mg/l (DEV-L2)	Bacteria (activated sludge)	Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations

Persistence and degradability: Elimination information: >70 % DOC reduction (28 d) (OECD 301 A, new version). Evaluation: Readily biodegradable.

Bioaccumulative potential: Evaluation of Bioaccumulative potential: Accumulation in organisms is not to be expected.

Mobility in soil (and other compartments if available): 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.

Results of PBT and vPvB assessment: According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/ very bioaccumulative) criteria.

Other adverse effects: The product does not contain substances that are listed in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

Additional information: Other ecotoxicological advice: Do not release untreated into natural waters. The product has not been tested. The statements on ecotoxicology have been derived from the properties of the individual components.

SECTION 13. Disposal Considerations

Waste treatment methods

Recommendations for the product: The product must be disposed or incinerated in accordance with local authority regulations, e.g. taken to special waste incineration plant.

Recommendations for the packaging: Uncontaminated packs can be re-used. Packaging that cannot be cleaned should be disposed of as product waste.

SECTION 14. Transport Information

Land transport - ADR/RID: Not classified as a dangerous good under transport regulations.
Inland waterway transp. - ADN: Not classified as a dangerous good under transport regulations.
Sea transport - IMDG: Not classified as a dangerous good under transport regulations.
Air transport - ICAO/IATA: Not classified as a dangerous good under transport regulations.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not evaluated.

SECTION 15. Regulatory Information

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

Chemical Safety Assessment

Chemical Safety Assessments are available for one or more of the component substances contained in this product.

SECTION 16. Other Information

Full text of the classifications, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, if mentioned in section 2 or 3. No classification of the product!

Xn	Harmful.
R22	Harmful if swallowed.
Acute Tox. Cat. 4	Acute Toxicity, Category 4.
STOT RE Cat. 2	Specific target organ toxiciy - repeated exposure, Category 2.
H302	Harmful if swallowed.
H373	May cause damage to organs (kidney) through prolonged or repeated exposure.

Acronyms used in this document in alphabetical order

ADN	European agreement concerning the international carriage of dangerous goods by inland waterways (Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures).
ADR	European agreement concerning the international carriage of dangerous goods by road (Accord européen relatif au transport des marchandises dangereuses par route).
ASTM	American Society for Testing and Materials.
CAS	Chemical Abstract Service.
CLP	Classification, Labelling and Packaging.
DEV	German standard methods for water, waste water and sludge analysis (Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlammuntersuchung).
DIN	German Standards Institute / German industrial norm (Deutsches Institut für Normung/ Deutsche Industrienorm).
DNEL	Derived No Effect Level.
DOC	Dissolved Organic Carbon.
EC50	Effective Concentration 50 %.
GHS	Globally Harmonised System of Classification, Labelling and Packaging of Chemicals.
IATA	Verband für den internationalen Lufttransport (International Air Transport Association).
IBC	International Bulk Chemicals.
ICAO	International Civil Aviation Organization.
IMDG	International Maritime Dangerous Goods Code.
INDEX	Annex VI of Regulation (EC) No. 1272/2008 [CLP/GHS].
LC50	Lethal Concentration 50 %.
LD50	Lethal Dose 50 %.
MARPOL	International Convention for the Prevention of Marine Pollution from Ships.
NOAEL	No Observed Adverse Effect Level.
OECD	Organization for Economic Cooperation and Development.
PNEC	Predicted No Effect Concentration.

SECTION 16. Other Information - Continuation

REACH	Registration, Evaluation and Authorization of Chemicals.
RID	Regulations concerning the international carriage of dangerous goods by rail (Règlement concernant le transport International ferroviaire de marchandises dangereuses).
TWA	Time Weighted Average.
WEL	Workplace Exposure Limit.

Vertical lines in the left hand margin indicate an amendment from the previous version.

This safety data sheet is intended to provide information and recommendations as to: 1. how to handle chemical substances and preparations in accordance with the essential requirements of safety precautions and physical, toxicological, and ecological data. 2. how to handle, store, use, transport them safely.

No liability for damage occurred in connection with the use of this information or with the use, application, adaption, or processing of the products here described will be accepted. No liability will be accepted for damage indirectly incured.

We provide this information and data according to our present level of knowledge and experience. No assurances concerning the characteristics of our product are hereby furnished.

SECTION 1. Identification of the Substance / Mixture and of the Company

Product identifier: **TYFOCOR®**
ready mix 30.0 vol. %, freezing point -16.1 °C

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

Relevant identified uses: Antifreeze and anti-corrosion fluid for thermotechnical systems

Details of the supplier of the safety data sheet

Identification of the company: TYFOROP Chemie GmbH, Anton-Rée-Weg 7, D - 20537 Hamburg
Tel.: +49 (0)40 -20 94 97-0, Fax: -20 94 97-20, e-mail: info@tyfo.de

Information about the product: E-mail (competent person): msds@tyfo.de

Emergency information: Tel.: +49 (0)551-19240 GIZ-Nord Poison Center

SECTION 2. Hazards identification

Classification of the substance or mixture

According to EC Directive 67/548/EEC or 1999/45/EC

Hazard symbol: Xn Harmful.
R-phrases: R22 Harmful if swallowed.

According to Regulation (EC) No. 1272/2008 [CLP/GHS]

Hazard classes/categories	Hazard Statements	
Acute Tox. Cat. 4	H302	Harmful if swallowed.
STOT RE Cat. 2	H373	May cause damage to organs (kidney) through prolonged or repeated exposure.

Label elements

According to Directive 67/548/EEC or 1999/45/EC ('Preparations Directive')

Advice on labelling: The product is subject to labelling. The classification was carried out according to the calculation procedure of the Preparations Directive (1999/45/EC).

Hazard symbol
Xn Harmful.

R-phrases
R22 Harmful if swallowed.

S-phrases
S2 Keep out of reach of children.
S24/25 Avoid contact with skin and eyes.
S46 If swallowed, seek medical advice immediately and show this container or label.

Hazard determinant component for labelling: Ethane-1,2-diol/ethylene glycol.

According to Regulation (EC) No. 1272/2008 [CLP/GHS]

Signal word: Warning.

GHS07

Hazard Statement
H302 Harmful if swallowed.
H373 May cause damage to organs (kidney) through prolonged or repeated exposure.

Precautionary Statements (Prevention)
P260 Do not breathe vapour/mist/aerosol.
P264 Wash with plenty of water and soap thorougly after handling.
P270 Do not eat, drink or smoke when using this product.

GHS08

Precautionary Statements (Response)
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P301+P330 IF SWALLOWED: rinse mouth.

Precautionary Statements (Disposal)
P501 Dispose of contents/container to hazardous or special waste collection point.

Hazard determinant component for labelling: Ethane-1,2-diol/ethylene glycol.

Other hazards: According to Regulation (EC) No. 1272/2008 [CLP]: No other hazards known.

SECTION 3. Composition / Information on Ingredients

Chemical nature: Ethane-1,2-diol (ethylene glycol). Inhibitors.

Hazardous ingredients according to Directive 1999/45/EC and Regulation 1272/2008/EC

Substance	Dir. 1999/45/EC	Reg. 1272/2008/EC [CLP/GHS]
Ethane-1,2-diol/ethylene glycol	Hazard symbol: Xn	Acute Tox. Cat. 4, H302
Content (w/w): <30 %	R-phrases: R22	STOT RE Cat. 2, H373
CAS Number: 107-21-1		
EC Number: 203-473-3		
INDEX Number: 603-027-00-1		
REACH Registration Number: 01-2119456816-28		

For the classifications not written out in full in this section, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, the full text is listed in section 16.

SECTION 4. First-Aid Measures

Description of first aid measures

General advice: Remove contaminated clothing.

If inhaled: If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact: Wash thoroughly with soap and water.

On contact with eyes: Wash affected eyes for at least 15 minutes under running water with eyelids held open.

On ingestion: Rinse mouth immediately and then drink plenty of water, seek medical attention. Administer 50 ml of pure ethanol in a drinkable concentration.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling of the product (see section 2) and/or in section 11. Further important symptoms and effects are so far not known.

Indication of any immediate medical attention and special treatment needed

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media: The product is non-flammable. Water spray, dry powder, and alcohol-resistant foam are suitable for extinguishing environmental fire.

Special hazards arising from the substance or mixture

Harmful vapours. Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

Advice for fire-fighters

Special protective equipment: Wear a self-contained breathing apparatus.

Further information

The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

SECTION 6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Use personal protective clothing.

Environmental precautions

Contain contaminated water/firefighting water. Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

For large amounts: Pump off product. Pick up residues with suitable absorbent material. Dispose of absorbed material in accordance with official regulations.

Additional information: High risk of slipping due to leakage/spillage of product.

SECTION 6. Accidental Release Measures - Continuation

Reference to other sections

Information regarding exposure controls / personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7. Handling and Storage

Precautions for safe handling

Advice on safe handling: Do not breathe vapour/mist/aerosol. Avoid contact with skin and eyes. No special precautions necessary.

Advice on protection against fire/explosion: Observe the general rules of industrial fire protection. No special precautions necessary.

Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels: Store containers tightly sealed in a cool, dry and well ventilated place.

Advice on storage compatibility: Do not store with strong oxidizing agents. Keep away from food, beverages and animal feedstuffs.

Specific end uses

For the relevant identified uses listed in section 1 the advice mentioned in this section 7 is to be observed.

SECTION 8. Exposure Control / Personal Protection

Control parameters

Components with occupational exposure limits

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Regulatory basis / Revision	Type of exposure limit value	Value / Remark
EH40/2005 Workplace Exposure Limits, UK	Long-term (8-hr TWA) Long-term (8-hr TWA) Short-term (15 minutes)	10 mg/m^3 / particulate, skin 52 mg/m^3; 20 ppm / vapour 104 mg/m^3; 40 ppm / vapour
Directive 2000/39/EC, 2000-06-16	Long-term (8-hr TWA) Short-term (15 minutes)	52 mg/m^3; 20 ppm 104 mg/m^3; 40 ppm

DNEL Values

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Route of exposure / Personnel	Duration of exposure / effect	Value
Skin / Workers	Long-term / systemic effects	106 mg/kg body weight/day
Inhalation / Workers	Long-term / local effects	35 mg/m^3
Skin / Consumers	Long-term / systemic effects	53 mg/kg body weight/day
Inhalation / Consumers	Long-term / local effects	7 mg/m^3

PNEC Values

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Environmental compartment	Value
Water (fresh water)	10 mg/l
Water (sea water)	1 mg/l
Water (intermittent release)	10 mg/l
Sediment (fresh water)	20.9 mg/kg sediment
Soil	1.53 mg/kg soil
Sewage treatment plant	199.5 mg/l

Exposure controls

Personal protective equipment

Respiratory protection: Suitable respiratory protection at higher concentrations or long-term effect. Gas filter for gases/vapours of organic compounds (b.p. >65 °C, e.g. EN 14387, type A).

Hand protection: Chemical resistant protective gloves (EN 374). Suitable materials also with prolonged, direct contact (recommended: Protective index 6, corresp. >480 minutes of permeation time according to EN 374), e.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), polyvinylchloride (0.7 mm) and other. Supple-

SECTION 8. Exposure Control / Personal Protection - Continuation

	mentary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing. Manufacturer's directions for use should be observed because of great diversity of types.
Eye protection:	Safety glasses with side-shields (frame goggles) (e.g. EN 166).
General safety and hygiene measures:	Do not breathe vapour/mist/aerosol. Avoid contact with skin and eyes. Handle in accordance with good industrial hygiene and safety practice. Wearing of closed work clothing is recommended.

SECTION 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	liquid.	
Colour:	green.	
Odour:	product specific.	
pH value (20 °C):	7.5 - 8.5.	(ASTM D 1287)
Freezing point:	approx. -16.1 °C	(ASTM D 1177)
Solidification temperature:	approx. -22.0 °C.	(DIN/ISO 3016)
Boiling point:	>100 °C.	(ASTM D 1120)
Flash point:	not applicable.	(DIN EN 22719, ISO 2719)
Flammability:	not flammable.	
Lower explosion limit:	3.2 % vol.	(Data for ethylene glycol)
Upper explosion limit:	15.0 % vol.	(Data for ethylene glycol)
Ignition temperature:	not applicable.	(DIN 51794)
Vapour pressure (20 °C):	approx. 20 hPa.	
Density (20 °C):	approx. 1.044 g/cm^3.	(DIN 51757)
Solubility (qualitative) solvents:	polar solvents: soluble.	
Partitioning coefficient n-octanol/water (log P_{ow}):	-1.36.	(Data for ethylene glycol)
Self ignition:	not self igniting.	
Viscosity (kinematic, 20 °C):	approx. 2.3 mm^2/s.	(DIN 51562)
Explosion hazard:	not explosive.	
Fire promoting properties:	not fire-propagating.	

Other Information

Miscibility with water:	miscible in all proportions.

SECTION 10. Stability and Reactivity

Reactivity:	No hazardous reactions if stored and handled as prescribed/indicated. Corrosion to metals: No corrosive effect on metals.
Chemical stability:	The product is stable if stored and handled as prescribed/indicated.
Possibility of hazardous reactions:	No hazardous reactions if stored and handled as prescribed/indicated.
Conditions to avoid:	No conditions to avoid anticipated.
Incompatible materials:	Substances to avoid: strong oxidising agents.
Hazardous decomposition products:	No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION 11. Toxicological Information

Information on toxicological effects

Acute toxicity / Irritation / Sensitization

Parameter	Value / Evaluation	Species	Remark
LD50 acute oral	>2000 mg/kg	Rat	Data relate to main component
LD50 acute dermal	>2000 mg/kg	Rabbit	Data relate to main component
Irritant effect on skin	non-irritant	Rabbit	Data relate to main component
Irritant effect on eye	non-irritant	Rabbit	Data relate to main component
Sensitization	non-sensitizing	Guinea pig	Data relate to main component

SECTION 11. Toxicological Information - Continuation

Repeated dose toxcity: Sub-acute oral toxicity: NOAEL 200 mg/kg, rat (male/female), OECD 407. Subchronic oral toxicity (feed): NOAEL 150 mg/kg, rat (male), OECD 408. Data relate to main component.

Assessment of mutagenicity: Based on evaluation of several tests the product is evaluated as not being mutagenic. Data relate to main component.

Assessment of toxicity to reproduction: No indications of toxic effects were observed in reproduction studies in animals. Data relate to main component.

Assessment of carcinogenicity: No indications of carcinogenic effects are available from longterm trials. Data relate to main component

Experiences made from practice: Information on Ethane-1,2-diol: **1.** Effects on central nervous system (CNS) and gastrointestinal tract (nausea, vomiting, dizziness, reflex inhibition, epileptiform seizures, convulsions, coma, respiratory arrest, circulatory collapse) within 30 min to 12 h. **2.** Effects on cardiac and pulmonary function (acceleration of pulse and breathing, increased blood pressure, possibly inflammatory mucosal changes, pulmonary edema, congestive heart failure) within 12-24 h. **3.** Renal impairment (oliguria to anuria, degeneration of the kidney tissue with oxalate crystal deposits) within 24-72 h. **4.** Degeneration of the central nervous system (double-sided facial paralysis, pupillary inequality, blurred vision, dysphagia, hyperreflexia, incoordination, cerebral oedema, deposit of calcium oxalate in the brain) within 6-14 days. Experimental/calculated data: Mean lethal dose: 1.2-1.5 g/kg, oral, adults. The symptoms/diagnosis/findings mentioned may result with smaller doses.

Other information on toxicity: The product has not been tested. The statements on toxicology refer to the main component. Information on Ethane-1,2-diol: A risk of teratogenicity is not to be feared if the WEL values are adhered to. Risk of skin resorption. The whole of the information available provides no indication of a carcinogenic effect. The product was classified according to the calculation procedure of the Preparations Directive (1999/45/EC).

SECTION 12. Ecological Information

Toxicity

Toxicity to	Value	Species	Remark
Fish	LC50 (96 h): >100 mg/l	Leuciscus idus	-
Aquatic invertebrates	EC50 (48 h): >100 mg/l	Daphnia magna	-
Aquatic plants	EC50 (72 h): >100 mg/l	Algae	-
Microorganisms	>1000 mg/l (DEV-L2)	Bacteria (activated sludge)	Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations

Persistence and degradability: Elimination information: >70 % DOC reduction (28 d) (OECD 301 A, new version). Evaluation: Readily biodegradable.

Bioaccumulative potential: Evaluation of Bioaccumulative potential: Accumulation in organisms is not to be expected.

Mobility in soil (and other compartments if available): 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.

Results of PBT and vPvB assessment: According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/ very bioaccumulative) criteria.

Other adverse effects: The product does not contain substances that are listed in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

Additional information: Other ecotoxicological advice: Do not release untreated into natural waters. The product has not been tested. The statements on ecotoxicology have been derived from the properties of the individual components.

SECTION 13. Disposal Considerations

Waste treatment methods

Recommendations for the product: The product must be disposed or incinerated in accordance with local authority regulations, e.g. taken to special waste incineration plant.

Recommendations for the packaging: Uncontaminated packs can be re-used. Packaging that cannot be cleaned should be disposed of as product waste.

SECTION 14. Transport Information

Land transport - ADR/RID: Not classified as a dangerous good under transport regulations.
Inland waterway transp. - ADN: Not classified as a dangerous good under transport regulations.
Sea transport - IMDG: Not classified as a dangerous good under transport regulations.
Air transport - ICAO/IATA: Not classified as a dangerous good under transport regulations.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not evaluated.

SECTION 15. Regulatory Information

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

Chemical Safety Assessment

Chemical Safety Assessments are available for one or more of the component substances contained in this product.

SECTION 16. Other Information

Full text of the classifications, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, if mentioned in section 2 or 3. No classification of the product!

Xn	Harmful.
R22	Harmful if swallowed.
Acute Tox. Cat. 4	Acute Toxicity, Category 4.
STOT RE Cat. 2	Specific target organ toxiciy - repeated exposure, Category 2.
H302	Harmful if swallowed.
H373	May cause damage to organs (kidney) through prolonged or repeated exposure.

Acronyms used in this document in alphabetical order

ADN	European agreement concerning the international carriage of dangerous goods by inland waterways (Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures).
ADR	European agreement concerning the international carriage of dangerous goods by road (Accord européen relatif au transport des marchandises dangereuses par route).
ASTM	American Society for Testing and Materials.
CAS	Chemical Abstract Service.
CLP	Classification, Labelling and Packaging.
DEV	German standard methods for water, waste water and sludge analysis (Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlammuntersuchung).
DIN	German Standards Institute / German industrial norm (Deutsches Institut für Normung/ Deutsche Industrienorm).
DNEL	Derived No Effect Level.
DOC	Dissolved Organic Carbon.
EC50	Effective Concentration 50 %.
GHS	Globally Harmonised System of Classification, Labelling and Packaging of Chemicals.
IATA	Verband für den internationalen Lufttransport (International Air Transport Association).
IBC	International Bulk Chemicals.
ICAO	International Civil Aviation Organization.
IMDG	International Maritime Dangerous Goods Code.
INDEX	Annex VI of Regulation (EC) No. 1272/2008 [CLP/GHS].
LC50	Lethal Concentration 50 %.
LD50	Lethal Dose 50 %.
MARPOL	International Convention for the Prevention of Marine Pollution from Ships.
NOAEL	No Observed Adverse Effect Level.
OECD	Organization for Economic Cooperation and Development.
PNEC	Predicted No Effect Concentration.

SECTION 16. Other Information - Continuation

REACH	Registration, Evaluation and Authorization of Chemicals.
RID	Regulations concerning the international carriage of dangerous goods by rail (Règlement concernant le transport International ferroviaire de marchandises dangereuses).
TWA	Time Weighted Average.
WEL	Workplace Exposure Limit.

Vertical lines in the left hand margin indicate an amendment from the previous version.

This safety data sheet is intended to provide information and recommendations as to: 1. how to handle chemical substances and preparations in accordance with the essential requirements of safety precautions and physical, toxicological, and ecological data. 2. how to handle, store, use, transport them safely.

No liability for damage occurred in connection with the use of this information or with the use, application, adaption, or processing of the products here described will be accepted. No liability will be accepted for damage indirectly incured.

We provide this information and data according to our present level of knowledge and experience. No assurances concerning the characteristics of our product are hereby furnished.

SECTION 1. Identification of the Substance / Mixture and of the Company

Product identifier: **TYFOCOR®**

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

Relevant identified uses: Antifreeze and anti-corrosion fluid for thermotechnical systems

Details of the supplier of the safety data sheet

Identification of the company: TYFOROP Chemie GmbH, Anton-Rée-Weg 7, D - 20537 Hamburg
Tel.: +49 (0)40 -20 94 97-0, Fax: -20 94 97-20, e-mail: info@tyfo.de

Information about the product: E-mail (competent person): msds@tyfo.de

Emergency information: Tel.: +49 (0)551-19240 GIZ-Nord Poison Center

SECTION 2. Hazards identification

Classification of the substance or mixture

According to EC Directive 67/548/EEC or 1999/45/EC

Hazard symbol: Xn Harmful.
R-phrases: R22 Harmful if swallowed.

According to Regulation (EC) No. 1272/2008 [CLP/GHS]

Hazard classes/categories	Hazard Statements	
Acute Tox. Cat. 4	H302	Harmful if swallowed.
STOT RE Cat. 2	H373	May cause damage to organs (kidney) through prolonged or repeated exposure.

Label elements

According to Directive 67/548/EEC or 1999/45/EC ('Preparations Directive')

Advice on labelling: The product is subject to labelling. The classification was carried out according to the calculation procedure of the Preparations Directive (1999/45/EC).

Hazard symbol
Xn Harmful.

R-phrases
R22 Harmful if swallowed.

S-phrases
S2 Keep out of reach of children.
S24/25 Avoid contact with skin and eyes.
S46 If swallowed, seek medical advice immediately and show this container or label.

Hazard determinant component for labelling: Ethane-1,2-diol/ethylene glycol.

According to Regulation (EC) No. 1272/2008 [CLP/GHS]

Signal word: Warning.

GHS07

Hazard Statement
H302 Harmful if swallowed.
H373 May cause damage to organs (kidney) through prolonged or repeated exposure.

Precautionary Statements (Prevention)
P260 Do not breathe vapour/mist/aerosol.
P264 Wash with plenty of water and soap thorougly after handling.
P270 Do not eat, drink or smoke when using this product.

GHS08

Precautionary Statements (Response)
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
P301+P330 IF SWALLOWED: rinse mouth.

Precautionary Statements (Disposal)
P501 Dispose of contents/container to hazardous or special waste collection point.

Hazard determinant component for labelling: Ethane-1,2-diol/ethylene glycol.

Other hazards: According to Regulation (EC) No. 1272/2008 [CLP]: No other hazards known.

SECTION 3. Composition / Information on Ingredients

Chemical nature: Ethane-1,2-diol (ethylene glycol). Inhibitors.

Hazardous ingredients according to Directive 1999/45/EC and Regulation 1272/2008/EC

Substance	Dir. 1999/45/EC	Reg. 1272/2008/EC [CLP/GHS]
Ethane-1,2-diol/ethylene glycol Content (w/w): >90 % CAS Number: 107-21-1 EC Number: 203-473-3 INDEX Number: 603-027-00-1 REACH Registration Number: 01-2119456816-28	Hazard symbol: Xn R-phrases: 22	Acute Tox. Cat. 4, H302 STOT RE Cat. 2, H373

For the classifications not written out in full in this section, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, the full text is listed in section 16.

SECTION 4. First-Aid Measures

Description of first aid measures

General advice: Remove contaminated clothing.

If inhaled: If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact: Wash thoroughly with soap and water.

On contact with eyes: Wash affected eyes for at least 15 minutes under running water with eyelids held open.

On ingestion: Rinse mouth immediately and then drink plenty of water, seek medical attention. Administer 50 ml of pure ethanol in a drinkable concentration.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling of the product (see section 2) and/or in section 11. Further important symptoms and effects are so far not known.

Indication of any immediate medical attention and special treatment needed

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media: water spray, dry powder, alcohol-resistant foam.

Special hazards arising from the substance or mixture

Harmful vapours. Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

Advice for fire-fighters

Special protective equipment: Wear a self-contained breathing apparatus.

Further information

The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

SECTION 6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Use personal protective clothing.

Environmental precautions

Contain contaminated water/firefighting water. Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

For large amounts: Pump off product. Pick up residues with suitable absorbent material. Dispose of absorbed material in accordance with official regulations.

Additional information: High risk of slipping due to leakage/spillage of product.

SECTION 6. Accidental Release Measures - Continuation

Reference to other sections

Information regarding exposure controls / personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7. Handling and Storage

Precautions for safe handling

Advice on safe handling: Ensure thorough ventilation of stores and work areas. Do not breathe vapour/mist/aerosol. Avoid contact with skin and eyes. Shut containers immediately after taking product because product takes up the humidity of air.

Advice on protection against fire / explosion: Observe the general rules of industrial fire protection.

Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels: Store containers tightly sealed in a cool, dry and well ventilated place.

Advice on storage compatibility: Do not store with strong oxidizing agents. Keep away from food, beverages and animal feedstuffs.

Specific end uses

For the relevant identified uses listed in section 1 the advice mentioned in this section 7 is to be observed.

SECTION 8. Exposure Control / Personal Protection

Control parameters

Components with occupational exposure limits

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Regulatory basis / Revision	Type of exposure limit value	Value / Remark
EH40/2005 Workplace Exposure Limits, UK	Long-term (8-hr TWA) Long-term (8-hr TWA) Short-term (15 minutes)	10 mg/m^3 / particulate, skin 52 mg/m^3; 20 ppm / vapour 104 mg/m^3; 40 ppm / vapour
Directive 2000/39/EC, 2000-06-16	Long-term (8-hr TWA) Short-term (15 minutes)	52 mg/m^3; 20 ppm 104 mg/m^3; 40 ppm

DNEL Values

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Route of exposure / Personnel	Duration of exposure / effect	Value
Skin / Workers	Long-term / systemic effects	106 mg/kg body weight/day
Inhalation / Workers	Long-term / local effects	35 mg/m^3
Skin / Consumers	Long-term / systemic effects	53 mg/kg body weight/day
Inhalation / Consumers	Long-term / local effects	7 mg/m^3

PNEC Values

Ethane-1,2-diol, EC Number 203-473-3, CAS Number 107-21-1

Environmental compartment	Value
Water (fresh water)	10 mg/l
Water (sea water)	1 mg/l
Water (intermittent release)	10 mg/l
Sediment (fresh water)	20.9 mg/kg sediment
Soil	1.53 mg/kg soil
Sewage treatment plant	199.5 mg/l

Exposure controls

Personal protective equipment

Respiratory protection: Suitable respiratory protection at higher concentrations or long-term effect. Gas filter for gases/vapours of organic compounds (b.p. >65 °C, e.g. EN 14387, type A).

Hand protection: Chemical resistant protective gloves (EN 374). Suitable materials also with prolonged, direct contact (recommended: Protective index 6, corresp. >480 minutes of permeation time according to EN 374), e.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), polyvinylchloride (0.7 mm) and other. Supple-

SECTION 8. Exposure Control / Personal Protection - Continuation

	mentary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing. Manufacturer's directions for use should be observed because of great diversity of types.
Eye protection:	Safety glasses with side-shields (frame goggles) (e.g. EN 166).
General safety and hygiene measures:	Do not breathe vapour/mist/aerosol. Avoid contact with skin and eyes. Handle in accordance with good industrial hygiene and safety practice. Wearing of closed work clothing is recommended.

SECTION 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	liquid.	
Colour:	green.	
Odour:	product specific.	
pH value (20 °C):	8.0 - 8.5.	(ASTM D 1287)
Solidification temperature:	≤-18 °C.	(DIN/ISO 3016)
Boiling point:	≥165 °C.	(ASTM D 1120)
Flash point:	126.5 °C.	(DIN EN 22719, ISO 2719)
Flammability:	not flammable.	
Lower explosion limit:	3.2 % vol.	(Data for ethylene glycol)
Upper explosion limit:	15.0 % vol.	(Data for ethylene glycol)
Ignition temperature:	440 °C.	(DIN 51794)
Vapour pressure (20 °C):	approx. 0.2 hPa.	
Density (20 °C):	1.120 - 1.125 g/cm^3.	(DIN 51757)
Solubility (qualitative) solvents:	polar solvents: soluble.	
Partitioning coefficient n-octanol/water (log P_{ow}):	-1.36.	(Data for ethylene glycol)
Self ignition:	not self igniting.	
Viscosity (kinematic, 20 °C):	20 - 30 mm^2/s.	(DIN 51562)
Explosion hazard:	not explosive.	
Fire promoting properties:	not fire-propagating.	

Other Information

Miscibility with water:	miscible in all proportions.
Hygroscopy:	hygroscopic.

SECTION 10. Stability and Reactivity

Reactivity:	No hazardous reactions if stored and handled as prescribed/indicated. Corrosion to metals: No corrosive effect on metals.
Chemical stability:	The product is stable if stored and handled as prescribed/indicated.
Possibility of hazardous reactions:	No hazardous reactions if stored and handled as prescribed/indicated.
Conditions to avoid:	No conditions to avoid anticipated.
Incompatible materials:	Substances to avoid: strong oxidising agents.
Hazardous decomposition products:	No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION 11. Toxicological Information

Information on toxicological effects

Acute toxicity / Irritation / Sensitization

Parameter	Value / Evaluation	Species	Remark
LD50 acute oral	>2000 mg/kg	Rat	Data relate to main component
LD50 acute dermal	>2000 mg/kg	Rabbit	Data relate to main component
Irritant effect on skin	non-irritant	Rabbit	Data relate to main component
Irritant effect on eye	non-irritant	Rabbit	Data relate to main component
Sensitization	non-sensitizing	Guinea pig	Data relate to main component

SECTION 11. Toxicological Information - Continuation

Repeated dose toxcity: Sub-acute oral toxicity: NOAEL 200 mg/kg, rat (male/female), OECD 407. Subchronic oral toxicity (feed): NOAEL 150 mg/kg, rat (male), OECD 408. Data relate to main component.

Assessment of mutagenicity: Based on evaluation of several tests the product is evaluated as not being mutagenic. Data relate to main component.

Assessment of toxicity to reproduction: No indications of toxic effects were observed in reproduction studies in animals. Data relate to main component.

Assessment of carcinogenicity: No indications of carcinogenic effects are available from longterm trials. Data relate to main component

Experiences made from practice: Information on Ethane-1,2-diol: **1.** Effects on central nervous system (CNS) and gastrointestinal tract (nausea, vomiting, dizziness, reflex inhibition, epileptiform seizures, convulsions, coma, respiratory arrest, circulatory collapse) within 30 min to 12 h. **2.** Effects on cardiac and pulmonary function (acceleration of pulse and breathing, increased blood pressure, possibly inflammatory mucosal changes, pulmonary edema, congestive heart failure) within 12-24 h. **3.** Renal impairment (oliguria to anuria, degeneration of the kidney tissue with oxalate crystal deposits) within 24-72 h. **4.** Degeneration of the central nervous system (double-sided facial paralysis, pupillary inequality, blurred vision, dysphagia, hyperreflexia, incoordination, cerebral oedema, deposit of calcium oxalate in the brain) within 6-14 days. Experimental/calculated data: Mean lethal dose: 1.2-1.5 g/kg, oral, adults. The symptoms/diagnosis/findings mentioned may result with smaller doses.

Other information on toxicity: The product has not been tested. The statements on toxicology refer to the main component. Information on Ethane-1,2-diol: A risk of teratogenicity is not to be feared if the WEL values are adhered to. Risk of skin resorption. The whole of the information available provides no indication of a carcinogenic effect. The product was classified according to the calculation procedure of the Preparations Directive (1999/45/EC).

SECTION 12. Ecological Information

Toxicity

Toxicity to	Value	Species	Remark
Fish	LC50 (96 h): >100 mg/l	Leuciscus idus	-
Aquatic invertebrates	EC50 (48 h): >100 mg/l	Daphnia magna	-
Aquatic plants	EC50 (72 h): >100 mg/l	Algae	-
Microorganisms	>1000 mg/l (DEV-L2)	Bacteria (activated sludge)	Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations

Persistence and degradability: Elimination information: >70 % DOC reduction (28 d) (OECD 301 A, new version). Evaluation: Readily biodegradable.

Bioaccumulative potential: Evaluation of Bioaccumulative potential: Accumulation in organisms is not to be expected.

Mobility in soil (and other compartments if available): 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.

Results of PBT and vPvB assessment: According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/ very bioaccumulative) criteria.

Other adverse effects: The product does not contain substances that are listed in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

Additional information: Other ecotoxicological advice: Do not release untreated into natural waters. The product has not been tested. The statements on ecotoxicology have been derived from the properties of the individual components.

SECTION 13. Disposal Considerations

Waste treatment methods

Recommendations for the product: The product must be disposed or incinerated in accordance with local authority regulations, e.g. taken to special waste incineration plant.

Recommendations for the packaging: Uncontaminated packs can be re-used. Packaging that cannot be cleaned should be disposed of as product waste.

SECTION 14. Transport Information

Land transport - ADR/RID: Not classified as a dangerous good under transport regulations.
Inland waterway transp. - ADN: Not classified as a dangerous good under transport regulations.
Sea transport - IMDG: Not classified as a dangerous good under transport regulations.
Air transport - ICAO/IATA: Not classified as a dangerous good under transport regulations.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not evaluated.

SECTION 15. Regulatory Information

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

Chemical Safety Assessment

Chemical Safety Assessments are available for one or more of the component substances contained in this product.

SECTION 16. Other Information

Full text of the classifications, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, if mentioned in section 2 or 3. No classification of the product!

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R22	Harmful if swallowed.
Acute Tox. Cat. 4	Acute Toxicity, Category 4.
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ASTM	American Society for Testing and Materials.
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DOC	Dissolved Organic Carbon.
EC50	Effective Concentration 50 %.
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IATA	Verband für den internationalen Lufttransport (International Air Transport Association).
IBC	International Bulk Chemicals.
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IMDG	International Maritime Dangerous Goods Code.
INDEX	Annex VI of Regulation (EC) No. 1272/2008 [CLP/GHS].
LC50	Lethal Concentration 50 %.
LD50	Lethal Dose 50 %.
MARPOL	International Convention for the Prevention of Marine Pollution from Ships.
NOAEL	No Observed Adverse Effect Level.
OECD	Organization for Economic Cooperation and Development.
PNEC	Predicted No Effect Concentration.

SECTION 16. Other Information - Continuation

REACH	Registration, Evaluation and Authorization of Chemicals.
RID	Regulations concerning the international carriage of dangerous goods by rail (Règlement concernant le transport International ferroviaire de marchandises dangereuses).
TWA	Time Weighted Average.
WEL	Workplace Exposure Limit.

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