

Osztály/jelzés	Név/e-mail	Telefon/telefax	Dátum	Oldal
VGQ-SC	Chris Hertgers	02191/18-0	2014.10.13.	1 / 1

Hőhordozó közegek azonossági nyilatkozata

Igen tisztelt Hölgyeim és Uraim!

Ezennel tanúsítjuk, hogy a Vaillant GmbH cég alább felsorolt hőhordozó közegei tartalmilag azonosak a TYFOROP Chemie GmbH cég hőhordozó közegeivel.

A Vaillant GmbH hőhordozó közegei Vaillant cikkszám	tartalmilag azonosak a	TYFOROP Chemie GmbH hőhordozó közegeivel
Készre kevert sóoldat, 20 l 0020096232	-	TYFOCOR® 44,3 térfogat%-os kész keverék, -30 °C-ig
Készre kevert sóoldat, 30 l 0020147182	-	TYFOCOR® 30,0 térfogat%-os kész keverék, -16,1 °C-ig
Sóoldat koncentrátum, 20 l 0020147185	-	TYFOCOR®
Sóoldat koncentrátum, 5 l 0020147186	-	TYFOCOR®



A Vaillant cég képviselőjében Marc Imann
Senior Expert of Certification



TYFOROP Chemie GmbH
Dr. Frank Hillerns, Head of R&D

Vaillant GmbH

Berghauser Str. 40 ■ 42859 Remscheid ■ Telefon 02191 18-0 ■ Telefax 02191 18-2810 ■ www.vaillant.de
Gesellschaft mit beschränkter Haftung ■ Sitz: Remscheid ■ Registergericht: Amtsgericht Wuppertal HRB 11775
Geschäftsführer: Dr. Carsten Voigtländer (Vorsitzender), Dr. Dietmar Meister, Dr. Norbert Schiedeck
Vorsitzender des Aufsichtsrates: Dr. Matthias Blaum ■ Bankverbindung: Commerzbank Remscheid ■ Bankleitzahl 340 400 49
Konto-Nummer 621 833 300 ■ IBAN DE67 3404 0049 0621 8333 00 ■ BIC-Code COBADEFF340 ■ USt-IdNr. DE 811142240



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision date 01.06.2015

Version: 4.0, ID-No.: 20230-g-01_GB-GB

Page 1/8

SECTION 1: Identification of the substance/mixture and of the company

- 1.1. Product identifier:** TYFOCOR®
ready mixed 30.0 vol. %, freezing point -16.1 °C
- 1.2. Relevant identified uses of the substance or mixture and uses advised against**
Relevant identified uses: Antifreeze and anti-corrosion fluid for thermotechnical systems
- 1.3. Details of the supplier of the safety data sheet**
Company: TYFOROP Chemie GmbH, Anton-Rée-Weg 7, D-20537 Hamburg
Telephone/Telefax: Tel.: +49 (0)40 20 94 97 0, Fax: +49 (0)40 20 94 97 20
E-Mail: msds@tyfo.de (E-Mail adress of person responsible for SDS)
- 1.4. Emergency telephone number:** Tel.: +49 (0)551-19240 GIZ-Nord Poison Center

SECTION 2: Hazards identification



2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]	Classification according to Directive 67/548/EEC [DSD] / 1999/45/EC [DPD]
Acute Tox. Cat. 4, H302 STOT RE Cat. 2, H373	Xn - Harmful R22, R48/22

The full text of the abbreviations is listed in section 16.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms	Signal word
	Warning
	Hazard Statements 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 skin with plenty of water and soap thoroughly after handling P270 Do not eat, drink or smoke when using this product
	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

2.3. Other hazards: None known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical nature: Aqueous solution of Ethane-1,2-diol (ethylene glycol) with inhibitors.

Hazardous components

Substance / REACH registration number	Content	CAS number	EC number	INDEX number	Classification acc. CLP	Classification acc. DSD
Ethane-1,2-diol 01-2119456816-28	< 30 %	107-21-1	203-473-3	603-027-00-1	Acute Tox.4, H302 STOT RE 2, H373	Xn, R22, R48/22

The full text of the abbreviations is listed in section 16.

SECTION 4: First aid measures**4.1. Description of first aid measures**

- I **General advice:** In the case of an accident or if you feel unwell, seek medical advice immediately. If symptoms persist or in cases of doubt seek medical advice.
- I **Protection of first-aiders:** First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
- I **If inhaled:** If inhaled, remove to fresh air. Get medical attention if symptoms occur.
- I **On skin contact:** Wash thoroughly with soap and water. Get medical attention if symptoms occur.
- I **On contact with eyes:** Wash affected eyes for at least 15 minutes under running water with eyelids held open. Get medical attention if irritation develops and persists.
- I **On ingestion:** Immediately rinse mouth thoroughly with water. Get medical attention. DO NOT induce vomiting unless directed to do so by medical personnel. Administer 50 ml of pure ethanol in a drinkable concentration.

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

The most important known symptoms and effects are described in sections 2 and/or 11. Further important symptoms and effects are so far not known.

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

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5: Firefighting measures**5.1. Extinguishing media**

- I **Suitable extinguishing media:** Water spray. Alcohol-resistant foam. Dry powder. Carbon dioxide (CO₂).
- I **Unsuitable extinguishing media:** None known.

5.2. Special hazards arising from the substance or mixture

- I **Specific hazards during firefighting:** Exposure to combustion products may be a hazard to health.
- I **Hazardous combustion products:** Carbon oxides.

5.3. Advice for fire-fighters

- I **Special protective equipment:** In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.
- I **Specific extinguishing methods:** Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

- I **Personal precautions:** Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

6.2. Environmental precautions

- I Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and material for containment and cleaning up

- I **Methods for cleaning up:** Soak up with inert absorbent material. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup

SECTION 6: Accidental release measures - Continuation

of releases. You will need to determine which regulations are applicable. Sections 13 and 15 provide information regarding certain local or national requirements.

I **6.4. Reference to other sections:** See sections 7, 8, 11, 12 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- I **Technical measures:** See Engineering measures in section 8.
- I **Local/total ventilation:** Use only with adequate ventilation.
- I **Advice on safe handling:** Avoid inhalation of vapour or mist. Do not swallow. Avoid contact with eyes. Avoid repeated or prolonged contact with skin. Handle in accordance with good industrial hygiene and safety practice. Shut containers immediately after taking product because product takes up the humidity of air. Take care to prevent spills, waste and minimize release to the environment.
- I **Advice on protection against fire and explosion:** Observe the general rules of industrial fire protection.
- I **Hygiene measures:** When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

7.2. Conditions for safe storage, including any incompatibilities

- I **Requirements for storage areas and containers:** Store containers tightly sealed in a cool, dry and well ventilated place. Store in accordance with the particular national regulations.
- Advice on common storage:** Do not store with strong oxidizing agents. Keep away from food, beverages and animal feedstuffs.

7.3. 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

8.1. Control parameters

Components with occupational exposure limits

Information on component Ethane-1,2-diol

Legal basis	Value type	Control parameters	Further information
2000/39/EC	TWA STEL	52 mg/m ³ , 20 ppm 104 mg/m ³ , 40 ppm	Identifies the possibility of significant uptake through the skin, indicative.
GB EH40	TWA (Vapour) TWA (Particles) STEL (Vapour)	52 mg/m ³ , 20 ppm 10 mg/m ³ 104 mg/m ³ , 40 ppm	Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.

DNEL values - information on component Ethane-1,2-diol

End use	Exposure routes	Potential health effects	Value
Workers	Inhalation	Long-term local effects	35 mg/m ³
Workers	Skin contact	Long-term systemic effects	106 mg/kg body weight/day
Consumers	Inhalation	Long-term local effects	7 mg/m ³
Consumers	Skin contact	Long-term systemic effects	53 mg/kg body weight/day

PNEC values - information on component Ethane-1,2-diol

Fresh water	Marine water	Water (intermittent release)	Fresh water sediment	Marine water sediment	Soil	Sewage treatment plant
10 mg/l	1 mg/l	10 mg/l	37 mg/kg	3.7 mg/kg	1.53 mg/kg	199.5 mg/l

SECTION 8: Exposure control/personal protection - Continuation

8.2. Exposure controls

	Engineering measures:	Ensure adequate ventilation, especially in confined areas. Minimize workplace exposure concentrations.
Personal protective equipment		
	Eye protection:	Safety glasses with side-shields (frame goggles, e.g. EN 166).
	Hand protection:	Chemical resistant protective gloves (EN 374). Material: butyl rubber. Protective index 6. Break through time: >480 minutes. Glove thickness: 0.6-0.8 mm. Remarks: Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the manufacturer. Wash hands before breaks and at the end of workday.
	Skin and body protection:	Wash skin thoroughly after contact.
	Respiratory protection:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Filter type: Organic vapour type (A).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

	Appearance:	liquid.	
	Colour:	green.	
	Odour:	almost odourless.	
	Odour threshold:	No data available.	
	pH value (20 °C):	7.5 - 8.5.	(ASTM D 1287)
	Freezing point:	ca. -16.1 °C.	(ASTM D 1177)
	Solidification temperature:	ca. -22.0 °C.	(DIN ISO 3016)
	Initial boiling point/boiling range:	>100 °C.	(ASTM D 1120)
	Flash point:	not applicable.	(DIN EN 22719, ISO 2719)
	Evaporation rate:	No data available.	
	Flammability (solid, gas):	not applicable.	
	Upper explosion limit:	15.0 % vol.	(Inform. on Ethylene glycol)
	Lower explosion limit:	3.2 % vol.	(Inform. on Ethylene glycol)
	Vapour pressure (20 °C):	ca. 20 hPa.	(calculated)
	Vapour density:	No data available.	
	Density (20 °C):	ca. 1.044 g/cm ³ .	(DIN 51757)
	Solubility:	Water solubility: soluble.	
	Partition coefficient n-octanol/H₂O:	log P _{ow} : -1.93.	(Inform. on Ethylene glycol)
	Auto-ignition temperature:	No data available.	
	Decomposition temperature:	No data available.	
	Viscosity (kinematic, 20 °C):	ca. 2.3 mm ² /s.	(DIN 51562)
	Explosive properties:	not explosive.	
	Oxidizing properties:	not oxidizing.	
	9.2. Other Information:	No other information.	

SECTION 10: Stability and reactivity

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects

- I **Information on likely routes of exposure:** Inhalation. Skin contact. Ingestion. Eye contact.
- I **Acute toxicity:** Harmful if swallowed.
 Information on the product:
 Acute oral toxicity: ATE: 1694.34 mg/kg, method: calculation method.
 Information on component Ethane-1,2-diol:
 Acute oral toxicity: ATE: 500 mg/kg, method: expert judgement. Remark: Based on harmonised classification in Reg. (EC) No. 1272/2008, Annex VI. Acute inhalation toxicity: LC50 (Rat): >2.5 mg/l (4 hours). Assessment: The substance has no acute inhalation toxicity. Acute dermal toxicity LD50 (Mouse): >3500 mg/kg.
- Skin corrosion/irritation:** Not classified based on available information.
 Information on component Ethane-1,2-diol: No skin irritation (Rabbit).
- Serious eye damage/eye irritation:** Not classified based on available information.
 Information on component Ethane-1,2-diol: No eye irritation (Rabbit).
- Respiratory or skin sensitisation:** Skin sensitisation: Not classified based on available information. Respiratory sensitisation: Not classified based on available information.
 Information on component Ethane-1,2-diol: Skin contact: not sensitising (Guinea pig, Magnusson-Kligman-Test).
- I **Germ cell mutagenicity:** Not classified based on available information.
 Information on component Ethane-1,2-diol: Genotoxicity in vitro: not mutagenic (Bacteria, Ames-Test), method: OECD test guideline 471.
- I **Carcinogenicity:** Not classified based on available information.
 Information on component Ethane-1,2-diol: not carcinogenic (Mouse), application route: ingestion, exposure time: 2 years.
- I **Reproductive toxicity:** Not classified based on available information.
- I **Specific target organ toxicity (single exposure):** Not classified based on available information.
- I **Specific target organ toxicity (repeated exposure):** May cause damage to organs through prolonged or repeated exposure.
 Information on component Ethane-1,2-diol: Target organ: Kidney. Assessment: Shown to produce significant health effects in animals at concentrations of >10 - 100 mg/kg body weight, exposure route: ingestion.
- I **Repeated dose toxicity:** Information on component Ethane-1,2-diol: NOAEL (Rat): 150 mg/kg, application route: ingestion, exposure time: 2 years. NOAEL (Dog): 2200 - 4400 mg/kg, application route: skin contact, exposure time: 4 weeks, method: OECD test guideline 410.
- I **Aspiration toxicity:** Not classified based on available information.
- Other information:** Information on Ethane-1,2-diol: Experimental/calculated data: Mean lethal dose: 1.2 - 1.5 g/kg body weight, oral, adults. The symptoms/diagnosis/findings mentioned may result with smaller doses.

Potential effects	Symptoms	Period of time
on central nervous system (CNS) and gastrointestinal tract	Nausea, vomiting, dizziness, reflex inhibition, epileptiform seizures, convulsions, coma, respiratory arrest, circulatory collapse	30 min - 12 h
on cardiac and pulmonary function	Acceleration of pulse and breathing, increased blood pressure, possibly inflammatory mucosal changes, pulmonary edema, congestive heart failure	12 - 24 h
Renal impairment	Oliguria to anuria, degeneration of the kidney tissue with oxalate crystal deposits	24 - 72 h
CNS degeneration	Double-sided facial paralysis, pupillary inequality, blurred vision, dysphagia, hyperreflexia, incoordination, cerebral oedema, deposit of calcium oxalate in the brain	6 - 14 d

SECTION 12: Ecological information

12.1. Toxicity

Information on component Ethane-1,2-diol

Toxicity to	Value / exposure time	Species
fish	LC50: 72860 mg/l / 96 h NOEC: 15380 mg/l / 7 d	Pimephales promelas (Fathead minnow)
daphnia and other aquatic invertebrates	EC50: >100 mg/l / 48 h NOEC: 8590 mg/l / 7 d	Daphnia magna (Water flea) Ceriodaphnia dubia (Water flea)
algae	EC50: 6500 - 13000 mg/l / 96 h	Pseudokirchneriella subcapitata (Green algae)

- I **12.2. Persistence and degradability:** Information on component Ethane-1,2-diol: Biodegradability: Biodegradation: 90 - 100 % (10 d), method: OECD test guideline 301 A. Result: readily biodegradable.
- I **12.3. Bioaccumulative potential:** Information on component Ethane-1,2-diol: Bioaccumulation: Bioconcentration factor (BCF): 10. Partition coefficient n-octanol/H₂O: log P_{ow}: -1.93.
- I **12.4. Mobility in soil:** No data available.
- I **12.5-Results of PBT and vPvB assessment:** The product does not contain a substance fulfilling the PBT criteria (persistent/bioaccumulative/toxic) or the vPvB criteria (very persistent/very bioaccumulative).
- I **12.6. Other adverse effects:** No data available.
- I **12.7. Further information:** No further information.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- I **Product:** Dispose of in accordance with local regulations. According to the European Waste Catalogue (EWC), waste codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
- I **Contaminated packaging:** Dispose of as the product. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

	ADR/ RID	ADN	IMDG	IATA/ ICAO
	Not classified as a dangerous good under transport regulations			
14.1. UN number	-	-	-	-
14.2. UN proper shipping name	-	-	-	-
14.3. Transport hazard classes	-	-	-	-
14.4. Packing group	-	-	-	-
14.5. Environmental hazards	-	-	-	-
14.6. Special precautions for user	-	-	-	-

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
 Not evaluated.

SECTION 15: Regulatory information

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

Legal basis	Remark / Evaluation
Regulation (EC) No. 649/2012 of the European Parliament and the Council concerning the export and import	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59)	Not applicable
Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer	Not applicable
Regulation (EC) No. 850/2004 on persistent organic pollutants	Not applicable
Seveso III - Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances	Not applicable

Other regulations

Take note of Directive 94/33/EC on the protection of young people at work.

15.2. Chemical Safety Assessment

A Chemical Safety Assessment was not carried out for the product.

SECTION 16: Other information

Full text of the abbreviations of classifications, H-Statements and R-Phrases used in sections 2 and 3

Acute Tox. Cat. 4	Acute Toxicity, Category 4.
STOT RE Cat. 2	Specific target organ toxicity - repeated exposure, Category 2
H302	Harmful if swallowed
H373	May cause damage to organs (kidney) through prolonged or repeated exposure
Xn	Harmful
R22	Harmful if swallowed
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.

Other abbreviations used in this safety data sheet in alphabetical order

ADN	European agreement concerning the international carriage of dangerous goods by inland waterways
ADR	European agreement concerning the international carriage of dangerous goods by road
ASTM	American Society for Testing and Materials
ATE	Acute Toxicity Estimate
CAS number	Chemical Abstracts Service number
CLP	Regulation (EC) No. 1272/2008 on classification, labeling and packaging of chemical substances and mixtures
DIN	German Institute for Standardisation/German Industrial Standard
DNEL	Derived No Effect Level
DPD	Dangerous Preparations Directive 1999/45/EC
DSD	Dangerous Substance Directive 67/548/EEC
EC50	Median Effective Concentration
EC number	EINECS number (European Inventory of Existing Substances) or ELINCS number (European List of Notified Chemical Substances)
GB EH40	UK EH40 WEL - Workplace Exposure Limits
GB EH40 STEL	Short-term exposure limit (15-minute reference period)
GB EH40 TWA	Long-term exposure limit (8-hour TWA reference period)
IATA	International Air Transport Association
IBC	International Bulk Chemicals
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
INDEX number	Identification code for hazardous substances, Annex VI of Regulation (EC) No. 1272/2008
ISO	International Organisation for Standardisation/International Standard

SECTION 16: Other information - Continuation

LC50	Median Lethal Concentration
LD50	Median Lethal Dose
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Cooperation and Development
PNEC	Predicted No Effect Concentration
REACH	Regulation (EC) No. 1907/2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Regulation concerning the international carriage of dangerous goods by rail
2000/39/EC	European Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
2000/39/EC STEL	Short Term Exposure Limit
2000/39/EC TWA	Time Weighted Average limit value - eight hours

Further information

I Sources of key data used to compile the safety data sheet: Internal technical data, data from component SDS, OECD eChem Portal search results and European Chemicals Agency [ECHA].

Revision date: 01.06.2015

Date of previous version: 01.11.2014

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

I The information provided in this safety data sheet (SDS) is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific product identified at the top of this SDS and may not be valid when the SDS product is used in combination with any other materials or in any process, unless specified in the text. Product users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS product in the user's end product, if applicable.



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision date 01.06.2015

Version: 4.0, ID-No.: 20130-g-01_GB-GB

Page 1/8

SECTION 1: Identification of the substance/mixture and of the company

- 1.1. Product identifier:** TYFOCOR®
ready mixed 44.3 vol. %, freezing point -30.0 °C
- 1.2. Relevant identified uses of the substance or mixture and uses advised against**
Relevant identified uses: Antifreeze and anti-corrosion fluid for thermotechnical systems
- 1.3. Details of the supplier of the safety data sheet**
Company: TYFOROP Chemie GmbH, Anton-Rée-Weg 7, D-20537 Hamburg
Telephone/Telefax: Tel.: +49 (0)40 20 94 97 0, Fax: +49 (0)40 20 94 97 20
E-Mail: msds@tyfo.de (E-Mail adress of person responsible for SDS)
- 1.4. Emergency telephone number:** Tel.: +49 (0)551-19240 GIZ-Nord Poison Center

SECTION 2: Hazards identification



2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]	Classification according to Directive 67/548/EEC [DSD] / 1999/45/EC [DPD]
Acute Tox. Cat. 4, H302 STOT RE Cat. 2, H373	Xn - Harmful R22, R48/22

The full text of the abbreviations is listed in section 16.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms	Signal word
	Warning
	Hazard Statements 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 skin with plenty of water and soap thoroughly after handling P270 Do not eat, drink or smoke when using this product
	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

2.3. Other hazards: None known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical nature: Aqueous solution of Ethane-1,2-diol (ethylene glycol) with inhibitors.

Hazardous components

Substance / REACH registration number	Content	CAS number	EC number	INDEX number	Classification acc. CLP	Classification acc. DSD
Ethane-1,2-diol 01-2119456816-28	<45 %	107-21-1	203-473-3	603-027-00-1	Acute Tox.4, H302 STOT RE 2, H373	Xn, R22, R48/22

The full text of the abbreviations is listed in section 16.

SECTION 4: First aid measures**4.1. Description of first aid measures**

- I **General advice:** In the case of an accident or if you feel unwell, seek medical advice immediately. If symptoms persist or in cases of doubt seek medical advice.
- I **Protection of first-aiders:** First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
- I **If inhaled:** If inhaled, remove to fresh air. Get medical attention if symptoms occur.
- I **On skin contact:** Wash thoroughly with soap and water. Get medical attention if symptoms occur.
- I **On contact with eyes:** Wash affected eyes for at least 15 minutes under running water with eyelids held open. Get medical attention if irritation develops and persists.
- I **On ingestion:** Immediately rinse mouth thoroughly with water. Get medical attention. DO NOT induce vomiting unless directed to do so by medical personnel. Administer 50 ml of pure ethanol in a drinkable concentration.

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

The most important known symptoms and effects are described in sections 2 and/or 11. Further important symptoms and effects are so far not known.

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

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5: Firefighting measures**5.1. Extinguishing media**

- I **Suitable extinguishing media:** Water spray. Alcohol-resistant foam. Dry powder. Carbon dioxide (CO₂).
- I **Unsuitable extinguishing media:** None known.

5.2. Special hazards arising from the substance or mixture

- I **Specific hazards during firefighting:** Exposure to combustion products may be a hazard to health.
- I **Hazardous combustion products:** Carbon oxides.

5.3. Advice for fire-fighters

- I **Special protective equipment:** In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.
- I **Specific extinguishing methods:** Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

- I **Personal precautions:** Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

6.2. Environmental precautions

- I Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and material for containment and cleaning up

- I **Methods for cleaning up:** Soak up with inert absorbent material. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup

SECTION 6: Accidental release measures - Continuation

of releases. You will need to determine which regulations are applicable. Sections 13 and 15 provide information regarding certain local or national requirements.

I **6.4. Reference to other sections:** See sections 7, 8, 11, 12 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- I **Technical measures:** See Engineering measures in section 8.
- I **Local/total ventilation:** Use only with adequate ventilation.
- I **Advice on safe handling:** Avoid inhalation of vapour or mist. Do not swallow. Avoid contact with eyes. Avoid repeated or prolonged contact with skin. Handle in accordance with good industrial hygiene and safety practice. Shut containers immediately after taking product because product takes up the humidity of air. Take care to prevent spills, waste and minimize release to the environment.
- I **Advice on protection against fire and explosion:** Observe the general rules of industrial fire protection.
- I **Hygiene measures:** When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

7.2. Conditions for safe storage, including any incompatibilities

- I **Requirements for storage areas and containers:** Store containers tightly sealed in a cool, dry and well ventilated place. Store in accordance with the particular national regulations.
- Advice on common storage:** Do not store with strong oxidizing agents. Keep away from food, beverages and animal feedstuffs.

7.3. 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

8.1. Control parameters

Components with occupational exposure limits

Information on component Ethane-1,2-diol

Legal basis	Value type	Control parameters	Further information
2000/39/EC	TWA STEL	52 mg/m ³ , 20 ppm 104 mg/m ³ , 40 ppm	Identifies the possibility of significant uptake through the skin, indicative.
GB EH40	TWA (Vapour) TWA (Particles) STEL (Vapour)	52 mg/m ³ , 20 ppm 10 mg/m ³ 104 mg/m ³ , 40 ppm	Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.

DNEL values - information on component Ethane-1,2-diol

End use	Exposure routes	Potential health effects	Value
Workers	Inhalation	Long-term local effects	35 mg/m ³
Workers	Skin contact	Long-term systemic effects	106 mg/kg body weight/day
Consumers	Inhalation	Long-term local effects	7 mg/m ³
Consumers	Skin contact	Long-term systemic effects	53 mg/kg body weight/day

PNEC values - information on component Ethane-1,2-diol

Fresh water	Marine water	Water (intermittent release)	Fresh water sediment	Marine water sediment	Soil	Sewage treatment plant
10 mg/l	1 mg/l	10 mg/l	37 mg/kg	3.7 mg/kg	1.53 mg/kg	199.5 mg/l

SECTION 8: Exposure control/personal protection - Continuation**8.2. Exposure controls**

	Engineering measures:	Ensure adequate ventilation, especially in confined areas. Minimize workplace exposure concentrations.
Personal protective equipment		
	Eye protection:	Safety glasses with side-shields (frame goggles, e.g. EN 166).
	Hand protection:	Chemical resistant protective gloves (EN 374). Material: butyl rubber. Protective index 6. Break through time: >480 minutes. Glove thickness: 0.6-0.8 mm. Remarks: Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the manufacturer. Wash hands before breaks and at the end of workday.
	Skin and body protection:	Wash skin thoroughly after contact.
	Respiratory protection:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Filter type: Organic vapour type (A).

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

	Appearance:	liquid.	
	Colour:	green.	
	Odour:	almost odourless.	
	Odour threshold:	No data available.	
	pH value (20 °C):	7.5 - 8.5.	(ASTM D 1287)
	Freezing point:	ca. -30.0 °C.	(ASTM D 1177)
	Solidification temperature:	ca. -36.4 °C.	(DIN ISO 3016)
	Initial boiling point/boiling range:	>100 °C.	(ASTM D 1120)
	Flash point:	not applicable.	(DIN EN 22719, ISO 2719)
	Evaporation rate:	No data available.	
	Flammability (solid, gas):	not applicable.	
	Upper explosion limit:	15.0 % vol.	(Inform. on Ethylene glycol)
	Lower explosion limit:	3.2 % vol.	(Inform. on Ethylene glycol)
	Vapour pressure (20 °C):	ca. 20 hPa.	(calculated)
	Vapour density:	No data available.	
	Density (20 °C):	ca. 1.065 g/cm ³ .	(DIN 51757)
	Solubility:	Water solubility: soluble.	
	Partition coefficient n-octanol/H₂O:	log P _{ow} : -1.93.	(Inform. on Ethylene glycol)
	Auto-ignition temperature:	No data available.	
	Decomposition temperature:	No data available.	
	Viscosity (kinematic, 20 °C):	ca. 3.6 mm ² /s.	(DIN 51562)
	Explosive properties:	not explosive.	
	Oxidizing properties:	not oxidizing.	
	9.2. Other Information:	No other information.	

SECTION 10: Stability and reactivity

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

SECTION 11: Toxicological information**11.1. Information on toxicological effects**

- I Information on likely routes of exposure:** Inhalation. Skin contact. Ingestion. Eye contact.
- I Acute toxicity:** Harmful if swallowed.
Information on the product:
Acute oral toxicity: ATE: 1168.50 mg/kg, method: calculation method.
Information on component Ethane-1,2-diol:
Acute oral toxicity: ATE: 500 mg/kg, method: expert judgement. Remark: Based on harmonised classification in Reg. (EC) No. 1272/2008, Annex VI. Acute inhalation toxicity: LC50 (Rat): >2.5 mg/l (4 hours). Assessment: The substance has no acute inhalation toxicity. Acute dermal toxicity LD50 (Mouse): >3500 mg/kg.
- Skin corrosion/irritation:** Not classified based on available information.
Information on component Ethane-1,2-diol: No skin irritation (Rabbit).
- Serious eye damage/eye irritation:** Not classified based on available information.
Information on component Ethane-1,2-diol: No eye irritation (Rabbit).
- Respiratory or skin sensitisation:** Skin sensitisation: Not classified based on available information. Respiratory sensitisation: Not classified based on available information.
Information on component Ethane-1,2-diol: Skin contact: not sensitising (Guinea pig, Magnusson-Kligman-Test).
- I Germ cell mutagenicity:** Not classified based on available information.
Information on component Ethane-1,2-diol: Genotoxicity in vitro: not mutagenic (Bacteria, Ames-Test), method: OECD test guideline 471.
- I Carcinogenicity:** Not classified based on available information.
Information on component Ethane-1,2-diol: not carcinogenic (Mouse), application route: ingestion, exposure time: 2 years.
- I Reproductive toxicity:** Not classified based on available information.
- I Specific target organ toxicity (single exposure):** Not classified based on available information.
- I Specific target organ toxicity (repeated exposure):** May cause damage to organs through prolonged or repeated exposure.
Information on component Ethane-1,2-diol: Target organ: Kidney. Assessment: Shown to produce significant health effects in animals at concentrations of >10 - 100 mg/kg body weight, exposure route: ingestion.
- I Repeated dose toxicity:** Information on component Ethane-1,2-diol: NOAEL (Rat): 150 mg/kg, application route: ingestion, exposure time: 2 years. NOAEL (Dog): 2200 - 4400 mg/kg, application route: skin contact, exposure time: 4 weeks, method: OECD test guideline 410.
- I Aspiration toxicity:** Not classified based on available information.
- Other information:** Information on Ethane-1,2-diol: Experimental/calculated data: Mean lethal dose: 1.2 - 1.5 g/kg body weight, oral, adults. The symptoms/diagnosis/findings mentioned may result with smaller doses.

Potential effects	Symptoms	Period of time
on central nervous system (CNS) and gastrointestinal tract	Nausea, vomiting, dizziness, reflex inhibition, epileptiform seizures, convulsions, coma, respiratory arrest, circulatory collapse	30 min - 12 h
on cardiac and pulmonary function	Acceleration of pulse and breathing, increased blood pressure, possibly inflammatory mucosal changes, pulmonary edema, congestive heart failure	12 - 24 h
Renal impairment	Oliguria to anuria, degeneration of the kidney tissue with oxalate crystal deposits	24 - 72 h
CNS degeneration	Double-sided facial paralysis, pupillary inequality, blurred vision, dysphagia, hyperreflexia, incoordination, cerebral oedema, deposit of calcium oxalate in the brain	6 - 14 d

SECTION 12: Ecological information

12.1. Toxicity

Information on component Ethane-1,2-diol

Toxicity to	Value / exposure time	Species
fish	LC50: 72860 mg/l / 96 h NOEC: 15380 mg/l / 7 d	Pimephales promelas (Fathead minnow)
daphnia and other aquatic invertebrates	EC50: >100 mg/l / 48 h NOEC: 8590 mg/l / 7 d	Daphnia magna (Water flea) Ceriodaphnia dubia (Water flea)
algae	EC50: 6500 - 13000 mg/l / 96 h	Pseudokirchneriella subcapitata (Green algae)

- I **12.2. Persistence and degradability:** Information on component Ethane-1,2-diol: Biodegradability: Biodegradation: 90 - 100 % (10 d), method: OECD test guideline 301 A. Result: readily biodegradable.
- I **12.3. Bioaccumulative potential:** Information on component Ethane-1,2-diol: Bioaccumulation: Bioconcentration factor (BCF): 10. Partition coefficient n-octanol/H₂O: log P_{ow}: -1.93.
- I **12.4. Mobility in soil:** No data available.
- I **12.5-Results of PBT and vPvB assessment:** The product does not contain a substance fulfilling the PBT criteria (persistent/bioaccumulative/toxic) or the vPvB criteria (very persistent/very bioaccumulative).
- I **12.6. Other adverse effects:** No data available.
- I **12.7. Further information:** No further information.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- I **Product:** Dispose of in accordance with local regulations. According to the European Waste Catalogue (EWC), waste codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
- I **Contaminated packaging:** Dispose of as the product. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

	ADR/ RID	ADN	IMDG	IATA/ ICAO
	Not classified as a dangerous good under transport regulations			
14.1. UN number	-	-	-	-
14.2. UN proper shipping name	-	-	-	-
14.3. Transport hazard classes	-	-	-	-
14.4. Packing group	-	-	-	-
14.5. Environmental hazards	-	-	-	-
14.6. Special precautions for user	-	-	-	-

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
 Not evaluated.

SECTION 15: Regulatory information

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

Legal basis	Remark / Evaluation
Regulation (EC) No. 649/2012 of the European Parliament and the Council concerning the export and import	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59)	Not applicable
Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer	Not applicable
Regulation (EC) No. 850/2004 on persistent organic pollutants	Not applicable
Seveso III - Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances	Not applicable

Other regulations

Take note of Directive 94/33/EC on the protection of young people at work.

15.2. Chemical Safety Assessment

A Chemical Safety Assessment was not carried out for the product.

SECTION 16: Other information

Full text of the abbreviations of classifications, H-Statements and R-Phrases used in sections 2 and 3

Acute Tox. Cat. 4	Acute Toxicity, Category 4.
STOT RE Cat. 2	Specific target organ toxicity - repeated exposure, Category 2
H302	Harmful if swallowed
H373	May cause damage to organs (kidney) through prolonged or repeated exposure
Xn	Harmful
R22	Harmful if swallowed
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.

Other abbreviations used in this safety data sheet in alphabetical order

ADN	European agreement concerning the international carriage of dangerous goods by inland waterways
ADR	European agreement concerning the international carriage of dangerous goods by road
ASTM	American Society for Testing and Materials
ATE	Acute Toxicity Estimate
CAS number	Chemical Abstracts Service number
CLP	Regulation (EC) No. 1272/2008 on classification, labeling and packaging of chemical substances and mixtures
DIN	German Institute for Standardisation/German Industrial Standard
DNEL	Derived No Effect Level
DPD	Dangerous Preparations Directive 1999/45/EC
DSD	Dangerous Substance Directive 67/548/EEC
EC50	Median Effective Concentration
EC number	EINECS number (European Inventory of Existing Substances) or ELINCS number (European List of Notified Chemical Substances)
GB EH40	UK EH40 WEL - Workplace Exposure Limits
GB EH40 STEL	Short-term exposure limit (15-minute reference period)
GB EH40 TWA	Long-term exposure limit (8-hour TWA reference period)
IATA	International Air Transport Association
IBC	International Bulk Chemicals
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
INDEX number	Identification code for hazardous substances, Annex VI of Regulation (EC) No. 1272/2008
ISO	International Organisation for Standardisation/International Standard

SECTION 16: Other information - Continuation

LC50	Median Lethal Concentration
LD50	Median Lethal Dose
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Cooperation and Development
PNEC	Predicted No Effect Concentration
REACH	Regulation (EC) No. 1907/2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Regulation concerning the international carriage of dangerous goods by rail
2000/39/EC	European Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
2000/39/EC STEL	Short Term Exposure Limit
2000/39/EC TWA	Time Weighted Average limit value - eight hours

Further information

I Sources of key data used to compile the safety data sheet: Internal technical data, data from component SDS, OECD eChem Portal search results and European Chemicals Agency [ECHA].

Revision date: 01.06.2015

Date of previous version: 01.11.2014

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

I The information provided in this safety data sheet (SDS) is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific product identified at the top of this SDS and may not be valid when the SDS product is used in combination with any other materials or in any process, unless specified in the text. Product users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS product in the user's end product, if applicable.



SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision date 01.06.2015

Version: 4.0, ID-No.: 2000-g-01_GB-GB

Page 1/8

SECTION 1: Identification of the substance/mixture and of the company

1.1. Product identifier: TYFOCOR®

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

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

1.3. Details of the supplier of the safety data sheet

Company: TYFOROP Chemie GmbH, Anton-Rée-Weg 7, D-20537 Hamburg

Telephone/Telefax: Tel.: +49 (0)40 20 94 97 0, Fax: +49 (0)40 20 94 97 20

E-Mail: msds@tyfo.de (E-Mail adress of person responsible for SDS)

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

SECTION 2: Hazards identification



2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]	Classification according to Directive 67/548/EEC [DSD] / 1999/45/EC [DPD]
Acute Tox. Cat. 4, H302 STOT RE Cat. 2, H373	Xn - Harmful R22, R48/22

The full text of the abbreviations is listed in section 16.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms	Signal word
	Warning
	
	Hazard Statements 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 skin with plenty of water and soap thoroughly after handling P270 Do not eat, drink or smoke when using this product
	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

2.3. Other hazards: None known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

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

Hazardous components

Substance / REACH registration number	Content	CAS number	EC number	INDEX number	Classification acc. CLP	Classification acc. DSD
Ethane-1,2-diol 01-2119456816-28	> 90 %	107-21-1	203-473-3	603-027-00-1	Acute Tox.4, H302 STOT RE 2, H373	Xn, R22, R48/22

The full text of the abbreviations is listed in section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

- I **General advice:** In the case of an accident or if you feel unwell, seek medical advice immediately. If symptoms persist or in cases of doubt seek medical advice.
- I **Protection of first-aiders:** First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
- I **If inhaled:** If inhaled, remove to fresh air. Get medical attention if symptoms occur.
- I **On skin contact:** Wash thoroughly with soap and water. Get medical attention if symptoms occur.
- I **On contact with eyes:** Wash affected eyes for at least 15 minutes under running water with eyelids held open. Get medical attention if irritation develops and persists.
- I **On ingestion:** Immediately rinse mouth thoroughly with water. Get medical attention. DO NOT induce vomiting unless directed to do so by medical personnel. Administer 50 ml of pure ethanol in a drinkable concentration.

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

The most important known symptoms and effects are described in sections 2 and/or 11. Further important symptoms and effects are so far not known.

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

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5: Firefighting measures

5.1. Extinguishing media

- I **Suitable extinguishing media:** Water spray. Alcohol-resistant foam. Dry powder. Carbon dioxide (CO₂).
- I **Unsuitable extinguishing media:** None known.

5.2. Special hazards arising from the substance or mixture

- I **Specific hazards during firefighting:** Exposure to combustion products may be a hazard to health.
- I **Hazardous combustion products:** Carbon oxides.

5.3. Advice for fire-fighters

- I **Special protective equipment:** In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.
- I **Specific extinguishing methods:** Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- I **Personal precautions:** Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.

6.2. Environmental precautions

- I Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

6.3. Methods and material for containment and cleaning up

- I **Methods for cleaning up:** Soak up with inert absorbent material. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup

SECTION 6: Accidental release measures - Continuation

of releases. You will need to determine which regulations are applicable. Sections 13 and 15 provide information regarding certain local or national requirements.

I **6.4. Reference to other sections:** See sections 7, 8, 11, 12 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- I **Technical measures:** See Engineering measures in section 8.
- I **Local/total ventilation:** Use only with adequate ventilation.
- I **Advice on safe handling:** Avoid inhalation of vapour or mist. Do not swallow. Avoid contact with eyes. Avoid repeated or prolonged contact with skin. Handle in accordance with good industrial hygiene and safety practice. Shut containers immediately after taking product because product takes up the humidity of air. Take care to prevent spills, waste and minimize release to the environment.
- I **Advice on protection against fire and explosion:** Observe the general rules of industrial fire protection.
- I **Hygiene measures:** When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

7.2. Conditions for safe storage, including any incompatibilities

- I **Requirements for storage areas and containers:** Store containers tightly sealed in a cool, dry and well ventilated place. Store in accordance with the particular national regulations.
- Advice on common storage:** Do not store with strong oxidizing agents. Keep away from food, beverages and animal feedstuffs.

7.3. 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

8.1. Control parameters

Components with occupational exposure limits

Information on component Ethane-1,2-diol

Legal basis	Value type	Control parameters	Further information
2000/39/EC	TWA STEL	52 mg/m ³ , 20 ppm 104 mg/m ³ , 40 ppm	Identifies the possibility of significant uptake through the skin, indicative.
GB EH40	TWA (Vapour) TWA (Particles) STEL (Vapour)	52 mg/m ³ , 20 ppm 10 mg/m ³ 104 mg/m ³ , 40 ppm	Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.

DNEL values - information on component Ethane-1,2-diol

End use	Exposure routes	Potential health effects	Value
Workers	Inhalation	Long-term local effects	35 mg/m ³
Workers	Skin contact	Long-term systemic effects	106 mg/kg body weight/day
Consumers	Inhalation	Long-term local effects	7 mg/m ³
Consumers	Skin contact	Long-term systemic effects	53 mg/kg body weight/day

PNEC values - information on component Ethane-1,2-diol

Fresh water	Marine water	Water (intermittent release)	Fresh water sediment	Marine water sediment	Soil	Sewage treatment plant
10 mg/l	1 mg/l	10 mg/l	37 mg/kg	3.7 mg/kg	1.53 mg/kg	199.5 mg/l

SECTION 8: Exposure control/personal protection - Continuation

8.2. Exposure controls

	Engineering measures:	Ensure adequate ventilation, especially in confined areas. Minimize workplace exposure concentrations.
Personal protective equipment		
	Eye protection:	Safety glasses with side-shields (frame goggles, e.g. EN 166).
	Hand protection:	Chemical resistant protective gloves (EN 374). Material: butyl rubber. Protective index 6. Break through time: >480 minutes. Glove thickness: 0.6-0.8 mm. Remarks: Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the manufacturer. Wash hands before breaks and at the end of workday.
	Skin and body protection:	Wash skin thoroughly after contact.
	Respiratory protection:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Filter type: Organic vapour type (A).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

	Appearance:	liquid.	
	Colour:	green.	
	Odour:	almost odourless.	
	Odour threshold:	No data available.	
	pH value (20 °C):	8.0 - 8.5.	(ASTM D 1287)
	Solidification temperature:	<-18 °C.	(DIN ISO 3016)
	Initial boiling point/boiling range:	>170 °C.	(ASTM D 1120)
	Flash point:	>110 °C.	(DIN EN 22719, ISO 2719)
	Evaporation rate:	No data available.	
	Flammability (solid, gas):	not applicable.	
	Upper explosion limit:	15.0 % vol.	(Inform. on Ethylene glycol)
	Lower explosion limit:	3.2 % vol.	(Inform. on Ethylene glycol)
	Vapour pressure (20 °C):	ca. 0.2 hPa.	(calculated)
	Vapour density:	No data available.	
	Density (20 °C):	ca. 1.125 g/cm ³ .	(DIN 51757)
	Solubility:	Water solubility: soluble.	
	Partition coefficient n-octanol/H₂O:	log P _{ow} : -1.93.	(Inform. on Ethylene glycol)
	Auto-ignition temperature:	No data available.	
	Decomposition temperature:	No data available.	
	Viscosity (kinematic, 20 °C):	20 - 30 mm ² /s.	(DIN 51562)
	Explosive properties:	not explosive.	
	Oxidizing properties:	not oxidizing.	
9.2. Other Information			
	Hygroscopy:	hygroscopic.	

SECTION 10: Stability and reactivity

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

SECTION 11: Toxicological information

11.1. Information on toxicological effects

- I Information on likely routes of exposure:** Inhalation. Skin contact. Ingestion. Eye contact.
- I Acute toxicity:** Harmful if swallowed.
Information on the product:
Acute oral toxicity: ATE: 545.66 mg/kg, method: calculation method.
Information on component Ethane-1,2-diol:
Acute oral toxicity: ATE: 500 mg/kg, method: expert judgement. Remark: Based on harmonised classification in Reg. (EC) No. 1272/2008, Annex VI. Acute inhalation toxicity: LC50 (Rat): >2.5 mg/l (4 hours). Assessment: The substance has no acute inhalation toxicity. Acute dermal toxicity LD50 (Mouse): >3500 mg/kg.
- Skin corrosion/irritation:** Not classified based on available information.
Information on component Ethane-1,2-diol: No skin irritation (Rabbit).
- Serious eye damage/eye irritation:** Not classified based on available information.
Information on component Ethane-1,2-diol: No eye irritation (Rabbit).
- Respiratory or skin sensitisation:** Skin sensitisation: Not classified based on available information. Respiratory sensitisation: Not classified based on available information.
Information on component Ethane-1,2-diol: Skin contact: not sensitising (Guinea pig, Magnusson-Kligman-Test).
- I Germ cell mutagenicity:** Not classified based on available information.
Information on component Ethane-1,2-diol: Genotoxicity in vitro: not mutagenic (Bacteria, Ames-Test), method: OECD test guideline 471.
- I Carcinogenicity:** Not classified based on available information.
Information on component Ethane-1,2-diol: not carcinogenic (Mouse), application route: ingestion, exposure time: 2 years.
- I Reproductive toxicity:** Not classified based on available information.
- I Specific target organ toxicity (single exposure):** Not classified based on available information.
- I Specific target organ toxicity (repeated exposure):** May cause damage to organs through prolonged or repeated exposure.
Information on component Ethane-1,2-diol: Target organ: Kidney. Assessment: Shown to produce significant health effects in animals at concentrations of >10 - 100 mg/kg body weight, exposure route: ingestion.
- I Repeated dose toxicity:** Information on component Ethane-1,2-diol: NOAEL (Rat): 150 mg/kg, application route: ingestion, exposure time: 2 years. NOAEL (Dog): 2200 - 4400 mg/kg, application route: skin contact, exposure time: 4 weeks, method: OECD test guideline 410.
- I Aspiration toxicity:** Not classified based on available information.
- Other information:** Information on Ethane-1,2-diol: Experimental/calculated data: Mean lethal dose: 1.2 - 1.5 g/kg body weight, oral, adults. The symptoms/diagnosis/findings mentioned may result with smaller doses.

Potential effects	Symptoms	Period of time
on central nervous system (CNS) and gastrointestinal tract	Nausea, vomiting, dizziness, reflex inhibition, epileptiform seizures, convulsions, coma, respiratory arrest, circulatory collapse	30 min - 12 h
on cardiac and pulmonary function	Acceleration of pulse and breathing, increased blood pressure, possibly inflammatory mucosal changes, pulmonary edema, congestive heart failure	12 - 24 h
Renal impairment	Oliguria to anuria, degeneration of the kidney tissue with oxalate crystal deposits	24 - 72 h
CNS degeneration	Double-sided facial paralysis, pupillary inequality, blurred vision, dysphagia, hyperreflexia, incoordination, cerebral oedema, deposit of calcium oxalate in the brain	6 - 14 d

SECTION 12: Ecological information

12.1. Toxicity

Information on component Ethane-1,2-diol

Toxicity to	Value / exposure time	Species
fish	LC50: 72860 mg/l / 96 h NOEC: 15380 mg/l / 7 d	Pimephales promelas (Fathead minnow)
daphnia and other aquatic invertebrates	EC50: >100 mg/l / 48 h NOEC: 8590 mg/l / 7 d	Daphnia magna (Water flea) Ceriodaphnia dubia (Water flea)
algae	EC50: 6500 - 13000 mg/l / 96 h	Pseudokirchneriella subcapitata (Green algae)

- I **12.2. Persistence and degradability:** Information on component Ethane-1,2-diol: Biodegradability: Biodegradation: 90 - 100 % (10 d), method: OECD test guideline 301 A. Result: readily biodegradable.
- I **12.3. Bioaccumulative potential:** Information on component Ethane-1,2-diol: Bioaccumulation: Bioconcentration factor (BCF): 10. Partition coefficient n-octanol/H₂O: log P_{ow}: -1.93.
- I **12.4. Mobility in soil:** No data available.
- I **12.5-Results of PBT and vPvB assessment:** The product does not contain a substance fulfilling the PBT criteria (persistent/bioaccumulative/toxic) or the vPvB criteria (very persistent/very bioaccumulative).
- I **12.6. Other adverse effects:** No data available.
- I **12.7. Further information:** No further information.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- I **Product:** Dispose of in accordance with local regulations. According to the European Waste Catalogue (EWC), waste codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.
- I **Contaminated packaging:** Dispose of as the product. Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

	ADR/ RID	ADN	IMDG	IATA/ ICAO
	Not classified as a dangerous good under transport regulations			
14.1. UN number	-	-	-	-
14.2. UN proper shipping name	-	-	-	-
14.3. Transport hazard classes	-	-	-	-
14.4. Packing group	-	-	-	-
14.5. Environmental hazards	-	-	-	-
14.6. Special precautions for user	-	-	-	-

- I **14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
 Not evaluated.

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance/mixture**

Legal basis	Remark / Evaluation
Regulation (EC) No. 649/2012 of the European Parliament and the Council concerning the export and import	Not applicable
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59)	Not applicable
Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer	Not applicable
Regulation (EC) No. 850/2004 on persistent organic pollutants	Not applicable
Seveso III - Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances	Not applicable

Other regulations

Take note of Directive 94/33/EC on the protection of young people at work.

15.2. Chemical Safety Assessment

A Chemical Safety Assessment was not carried out for the product.

SECTION 16: Other information**Full text of the abbreviations of classifications, H-Statements and R-Phrases used in sections 2 and 3**

Acute Tox. Cat. 4	Acute Toxicity, Category 4.
STOT RE Cat. 2	Specific target organ toxicity - repeated exposure, Category 2
H302	Harmful if swallowed
H373	May cause damage to organs (kidney) through prolonged or repeated exposure
Xn	Harmful
R22	Harmful if swallowed
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.

Other abbreviations used in this safety data sheet in alphabetical order

ADN	European agreement concerning the international carriage of dangerous goods by inland waterways
ADR	European agreement concerning the international carriage of dangerous goods by road
ASTM	American Society for Testing and Materials
ATE	Acute Toxicity Estimate
CAS number	Chemical Abstracts Service number
CLP	Regulation (EC) No. 1272/2008 on classification, labeling and packaging of chemical substances and mixtures
DIN	German Institute for Standardisation/German Industrial Standard
DNEL	Derived No Effect Level
DPD	Dangerous Preparations Directive 1999/45/EC
DSD	Dangerous Substance Directive 67/548/EEC
EC50	Median Effective Concentration
EC number	EINECS number (European Inventory of Existing Substances) or ELINCS number (European List of Notified Chemical Substances)
GB EH40	UK EH40 WEL - Workplace Exposure Limits
GB EH40 STEL	Short-term exposure limit (15-minute reference period)
GB EH40 TWA	Long-term exposure limit (8-hour TWA reference period)
IATA	International Air Transport Association
IBC	International Bulk Chemicals
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods Code
INDEX number	Identification code for hazardous substances, Annex VI of Regulation (EC) No. 1272/2008
ISO	International Organisation for Standardisation/International Standard

SECTION 16: Other information - Continuation

LC50	Median Lethal Concentration
LD50	Median Lethal Dose
MARPOL	International Convention for the Prevention of Marine Pollution from Ships
NOAEL	No Observed Adverse Effect Level
NOEC	No Observed Effect Concentration
OECD	Organisation for Economic Cooperation and Development
PNEC	Predicted No Effect Concentration
REACH	Regulation (EC) No. 1907/2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Regulation concerning the international carriage of dangerous goods by rail
2000/39/EC	European Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
2000/39/EC STEL	Short Term Exposure Limit
2000/39/EC TWA	Time Weighted Average limit value - eight hours

Further information

- I Sources of key data used to compile the safety data sheet: Internal technical data, data from component SDS, OECD eChem Portal search results and European Chemicals Agency [ECHA].

Revision date: 01.06.2015

Date of previous version: 01.11.2014

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

- I The information provided in this safety data sheet (SDS) is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific product identified at the top of this SDS and may not be valid when the SDS product is used in combination with any other materials or in any process, unless specified in the text. Product users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS product in the user's end product, if applicable.