

Standard Operating Procedure

Procedure for the Analysis of Ballast Water to determine the Concentration of Vibrio cholerae using the Fluorescence in situ Hybridisation Method

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1 BACKGROUND

In 2004 the International Maritime Organization of the United Nations set up the '*International Convention for the Control and Management of Ships' Ballast Water and Sediments*'. According to article 18 of this convention the regulations and requirements therein come into force 12 months after 30 states ratified the convention representing 35% gross tonnage of the world's merchant shipping.

In view of the fact that organism transported with ballast water of ships and released into the sea including estuaries and into fresh water courses may cause severe and irreversible ecological damages, impair biological diversity and create hazards to human health, property or resources, this convention regulates that all ships to which this convention applies shall treat the ballast water by adequate on-board technologies to achieve a quality, which is defined by limit values for the density of organisms in the treated ballast water to be re-discharged to the sea, estuaries or fresh water courses.

The annex to the convention, Section D, '*Standards for Ballast Water Management*', Regulation D-2 '*Ballast Water Performance Standard*' defines these limit values for the density of organisms in ballast water to be re-discharged to the sea, estuaries or freshwater courses as :

Organism / Organism Group	Limit Value
Plankton Organisms >50µm	<10 viable organisms per m ³
Plankton Organisms >10µm<50µm	<10 viable organisms per ml
Bacteria	
<i>Escherichia coli</i>	<250 cfu per 100ml
Intestinal Enterococci	<100 cfu per 100ml
<i>Vibrio cholerae</i> (O1 and O139)	<1 cfu per 100ml
(cfu : colony forming unit)	

To control the compliance of this regulation adequate technologies and methods to generate ballast water samples on board ships and to execute the analysis of the ballast water have to be defined.

In 2011 the *Federal German Hydrographic and Maritime Agency (BSH)*, Hamburg, Germany, launched the research and development project '*Effective New Technologies for the Assessment of Compliance with the Ballast Water Management Convention*', which aimed at the development of technologies and methods to rapidly sample and assess the ballast water quality on board ships.

Within the frame of this project a new, innovative sampling system as well as several analytical methods have been developed which allow for the rapid assessment of the ballast water on board ships.

The project was managed, conducted and executed by *SGS S.A., Environmental Services, Geneva, Switzerland* and *SGS Institut Fresenius GmbH, Taunusstein, Germany* in cooperation with international scientific institutions and companies.

On board technologies and methods to sample ballast water and assess its quality should, above all, generate reliable data within a minimal time, since these compliance tests can, at present, only be executed during unload and load procedures while the ships stay in the harbor.

The classical methods (visual counts of plankton organisms under the microscope; 24/48 hour incubation of ballast water sample on species specific agars) are not suitable to be executed on board ships, especially since, among other, the methods require the incubation of human pathogen bacteria.

Therefore the BSH project aimed to identify technologies and method, which can be executed on board ships even if these methods could only generated indicative results.

2 INTRODUCTION

This procedure describes the identification and quantification of the microbial indicator *Vibrio cholerae* in Ballast Water samples. The analysis is based on the molecular-biological method FISH (Fluorescence in situ hybridization). Samples are filtrated on 0,45 µm filter membranes and filter membranes are cultivated on a suitable agar plate for 7,5 hours. Afterwards, grown micro-colonies are analyzed by using specific gene probes. Target bacteria are identified and quantified.

The time needed from sample to result is < 12 hours.

The lower sensitivity range is given with 1 cfu per 100ml.

The method has been validated by an independent laboratory specialized in microbiology.

Reference is made to various documents and other sources listed in para 8.

3 EQUIPMENT

- Standard filtration unit including suitable vacuum pump
- Filtration tube rubber stopper, 7 mm drill-hole suitable
- Filter funnel PS, suitable for membrane filters with a diameter of 25 mm
- Tweezers, sterile
- Micro-pipettes
- Incubator (37°C)
- Incubator (46°C +/- 2°C)
- Suitable support stand for e.g. Eppendorf reaction vials
- Fluorescence microscope, equipped with suitable filters

4 SUPPLIES

- Testkit ScanVIT-Ballast Water Vibrio cholerae
- M1 agar
- Pure ethanol (96–100%)
- Distilled water
- Tips, sterile
- Petri dish, empty

5 PROCEDURE

Preparation of solutions necessary for the analysis (once per test kit)

1. "Solution B3": Addition of 4 ml of pure ethanol to "Solution B3", mixing and marking bottle
2. "Washing buffer": 2 ml of washing buffer are required per test. For this 10-fold concentrated "Solution D5B" is diluted with distilled water. Washing buffer is filled in "Washing bottle" and preheated to 46 °C for at least 30 min.
3. "Aqua Bottle": 2 ml of distilled water are required per test. For easier application distilled water is added to "Aqua bottle" and stored at room temperature.

Analysis : filtration and cultivation

1. Filtration of Ballast Water sample (100 ml) on 25 mm membrane filter with filtration funnel
2. Transfer of membrane filter to TCBS agar plate by using sterile tweezers
3. Incubation of TCBS agar with membrane filter aerobically at 37 °C for 8 h

Analysis : pre-hybridization

1. Filtration of Ballast Water sample (100 ml) on 25 mm membrane filter with filtration funnel
2. Transfer of membrane filter to TCBS agar plate by using sterile tweezers
3. Incubation of TCBS agar with membrane filter aerobically at 37 °C for 8 h
4. Transfer of cultivated membrane filter from TCBS agar into an empty petri dish
5. Application of 3 drops of "Solution B3" to the membrane filter. Drying at room temperature (RT), 15 min.
6. Application of 2 drops of "Pre-VIT5" to the membrane filter. Drying at RT, 10 min.
7. Compilation of "ScanVIT-Reactor" with caps and placing the base component of the "ScanVIT-Reactor" on a suitable support stand
8. Place one "Pad" on the base component
9. Application of 6 drops of "Pre-VIT5" onto "Pad"
10. Place pre-hybridized membrane filter on top of the humid "Pad" by using tweezers

Analysis : hybridization - washing

1. Application of 3 drops of gene probe solution "VIT (BwV)" onto the membrane filter
2. Closing "ScanVIT-Reactor" with upper component and placing the "ScanVIT-Reactor" in stable straight position
3. Incubation: 46 °C, 90 min.
4. Removal of upper component of "ScanVIT-Reactor"
5. Placing filled Water bottle on top of "ScanVIT-Reactor"
6. Filling "ScanVIT-Reactor" with 2 ml of Washing buffer from "Washing bottle"
7. Replacing upper cap and incubation "ScanVIT-Reactor" at 46 °C for 15 min.
8. Removal of both caps from the "ScanVIT-Reactor"
9. Pressing "ScanVIT-Reactor" onto the rubber stopper of the filter funnel, and removal of washing buffer by turning on the vacuum
10. Filling "ScanVIT-Reactor" with 2 ml of distilled water from "Aqua bottle"
11. Pressing "ScanVIT-Reactor" onto the rubber stopper of the filter funnel, and removal of washing buffer by turning on the vacuum
12. Removal of membrane filter from "ScanVIT-Reactor" by using tweezers to either empty petri dish (longer storage) or "slide" (direct microscopy)

Analysis : fluorescence microscopy

1. Placing membrane filter onto "slide"
2. Application of 3 drops of "Finisher S" to membrane filter
3. Microscopy: Using a 100-fold magnification analysis of the complete membrane filters for green shining micro-colonies (= *Vibrio cholerae*)

6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1. Procedures outlined in this SOP should be followed to the letter. Any deviation should be documented.
2. Conduct all quality assurance and quality control procedures according to relevant QA/QC standards of the executing institution or company.

7 DATA STORAGE AND ARCHIVING

1. Storage and archival storage of data should be executed following relevant guidelines and SOPs of the executing institution or company.

8 REFERENCES AND RELATED DOCUMENTS

'Effective New Technologies for the Assessment of Compliance with the Ballast Water Management Convention', project reports

'The detection of bacteria in ballast water samples by means of Fluorescence in situ Hybridization' validation report

'ScanVIT-Ballast water Vibrio cholerae', test kit manual

Websites :

International Maritime Organization – IMO : www.imo.org

Mikrobiologie vermicon AG : www.vermicon.com

9 APPENDIX

CONTACT

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MATERIAL SAFETY DATA SHEETS

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Negative Control

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

1.1 Product identifier

Negative Control

Positive Control

Positive Control B1

Positive Control BL1

Positive Control G

Positive Control K

Positive Control PV

Pre-VIT

Pre-VITL1

Pre-VIT5

Solution C1

Solution C2

Solution C3

Solution C4

Solution C5

Solution C6

Solution C7

VIT (021N)

VIT (1851)

VIT (Ali)

VIT (Amx)

VIT (BaH)

VIT (B-Lbr)

VIT (BwE)

VIT (BvE)

VIT (Cam)

VIT (Cron)

VIT (Eco)

VIT (Eco) M

VIT (Ent)

VIT (Esak)

VIT (GFH)

VIT (Hhy)

VIT (Lab)

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VIT (Lmo)
VIT (Lpn)
VIT (Lpn) M
VIT (MB)
VIT (Meg/Pec)
VIT (MiBR1)
VIT (Mpa)
VIT (M/P)SE2
VIT (Nit)
VIT (Nit) SE3
VIT (Noc)
VIT (Noli)
VIT (Pae)
VIT (Pae) M
VIT (Pho)
VIT (Sal)
VIT (Sal) OD
VIT (Sta)
VIT (STTNP3)
VIT (Yer)

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

Relevant identified uses of the substance or mixture:

Sector of use [SU]:

SU 3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

SU 4 - Manufacture of food products

SU24 - Scientific research and development

Chemical product category [PC]:

PC21 - Laboratory chemicals

Process category [PROC]:

PROC15 - Use a laboratory reagent.

Article Categories [AC]:

AC99 - Not required.

Environmental Release Category [ERC]:

ERC99 - Not required.

Uses advised against:

No information available at present.

1.3 Details of the supplier of the safety data sheet

vermicon AG, Emmy-Noether-Str. 2, D-80992 München

Telephone +49 (0)89 1 58 82-0, Fax +49 (0)89 1 58 82-1 00

E-mail address of the competent person: info@chemical-check.de, k.schnurbusch@chemical-check.de

1.4 Emergency telephone

Advisory office in case of poisoning:

Telephone number of the company in case of emergencies:

Tel.: +49 (0)89 1 58 82-0

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SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) 1272/2008 (CLP)

Not determined

2.1.2 Classification according to Directives 67/548/EEC and 1999/45/EC (including amendments)

Repr. Cat. 2, Toxic to reproduction, R61

2.2 Label elements

2.2.1 Labeling according to Regulation (EC) 1272/2008 (CLP)

Not determined

2.2.2 Labeling according to Directives 67/548/EEC and 1999/45/EC (including amendments)



Symbols: T

Indications of danger:

Toxic

R-phrases:

61 May cause harm to the unborn child.

S-phrases:

53 Avoid exposure - obtain special instructions before use.

35 This material and its container must be disposed of in a safe way.

36/37 Wear suitable protective clothing and gloves.

45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Additions:

Formamide

Restricted to professional users.

2.3 Other hazards

The mixture does not contain any vPvB substance (vPvB = very persistent, very bioaccumulative) or is not included under XIII of the regulation (EC) 1907/2006.

The mixture does not contain any PBT substance (PBT = persistent, bioaccumulative, toxic) or is not included under XIII of the regulation (EC) 1907/2006.

SECTION 3: Composition/information on ingredients

3.1 Substance

n.a.

3.2 Mixture

Formamide	SVHC-substance
Registration number (REACH)	--
Index	616-052-00-8
EINECS, ELINCS, NLP	200-842-0
CAS	CAS 75-12-7
content %	10-80
Classification according to Directive 67/548/EEC	Toxic to reproduction, R61, Repr.Cat.2
Classification according to Regulation (EC) 1272/2008 (CLP)	Repr. 1B, H360D

For the text of the R-phrases / H-phrases and classification codes (GHS/CLP), see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation

Remove person from danger area.

Supply person with fresh air and consult doctor according to symptoms.

Skin contact

Wash thoroughly using copious water - remove contaminated clothing immediately.

Eye contact

Wash thoroughly for several minutes using copious water. Seek medical help if necessary.

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Ingestion

Rinse the mouth thoroughly with water.
Consult doctor immediately - keep Data Sheet available.

4.2 Most important symptoms and effects, both acute and delayed

If applicable delayed symptoms and effects can be found in section 11 and the absorption route in section 4.1.

The following may occur:

Coordination disorders
Skin resorption
Liver and kidney damage

4.3 Indication of any immediate medical attention and special treatment needed

n.c.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Extinction powder
Foam
Water jet spray

Unsuitable extinguishing media

n.c.

5.2 Special hazards arising from the substance or mixture

In case of fire the following can develop:

Oxides of carbon
Oxides of nitrogen

5.3 Advice for firefighters

Protective respirator with independent air supply.
According to size of fire
Full protection, if necessary
Dispose of contaminated extinction water according to official regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Ensure sufficient supply of air.
Avoid inhalation, and contact with eyes or skin.
Avoid all contact with product.

6.2 Environmental precautions

If leakage occurs, dam up.
Prevent from entering drainage system.
Prevent surface and ground-water infiltration, as well as ground penetration.

6.3 Methods and material for containment and cleaning up

Soak up with absorbent material (e.g. universal binding agent) and dispose of according to Section 13.

6.4 Reference to other sections

For personal protective equipment see Section 8 and for disposal instructions see Section 13.

SECTION 7: Handling and storage

In addition to information given in this section, relevant information can also be found in section 8 and 6.1.

7.1 Precautions for safe handling

7.1.1 General recommendations

Ensure good ventilation.
Avoid aerosol formation.
Eating, drinking, smoking, as well as food-storage, is prohibited in work-room.
Separate storage of protective clothing.
Observe directions on label and instructions for use.
Only use working methods according to operating instructions.

7.1.2 Notes on general hygiene measures at the workplace

General hygiene measures for the handling of chemicals are applicable.

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Wash hands before breaks and at end of work.
Keep away from food, drink and animal feedingstuffs.
Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

7.2 Conditions for safe storage, including any incompatibilities

Keep out of access to unauthorised individuals.
Not to be stored in gangways or stair wells.
Store product closed and only in original packing.
Observe par. 24 of the German Dangerous Materials Regulations (GefStoffV).
Store cool
Keep locked away.
Store in a dry place.
Protect from direct sunlight.
Only store at temperatures from 15°C to 25°C.

7.3 Specific end use(s)

No information available at present.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Chemical Name	Formamide	Content %:10-80	
WEL-TWA: 20 ppm (37 mg/m ³)	WEL-STEL: 30 ppm (56 mg/m ³)	---	
BMGV: ---	Other information: ---		

WEL-TWA = Workplace Exposure Limit - Long-term exposure limit (8-hour TWA (= time weighted average) reference period) EH40. AGW = "Arbeitsplatzgrenzwert" (workplace limit value, Germany). | WEL-STEL = Workplace Exposure Limit - Short-term exposure limit (15-minute reference period). | BMGV = Biological monitoring guidance value EH40. BGW = "Biologischer Grenzwert" (biological limit value, Germany) | Other information: Sen = Capable of causing occupational asthma. Sk = Can be absorbed through skin. Carc = Capable of causing cancer and/or heritable genetic damage.

** = The exposure limit for this substance is repealed through the TRGS 900 (Germany) of January 2006 with the goal of revision.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Ensure good ventilation. This can be achieved by local suction or general air extraction.
If this is insufficient to maintain the concentration under the WEL or AGW values, suitable breathing protection should be worn.
Applies only if maximum permissible exposure values are listed here.

8.2.2 Individual protection measures, such as personal protective equipment

General hygiene measures for the handling of chemicals are applicable.
Wash hands before breaks and at end of work.
Keep away from food, drink and animal feedingstuffs.
Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

Eye/face protection:
Tight fitting protective goggles with side protection (EN 166).

Skin protection - Hand protection:
Protective hand cream recommended.
Safety gloves made of natural rubber latex (EN 374).
Safety gloves made of chloroprene (EN 374).
Protective nitrile gloves (EN 374)
Safety gloves made of vinyl (EN 374)
Safety gloves made of butyl (EN 374)
Permeation time (penetration time) in minutes:
> 480
The recommended maximum wearing time is 50% of breakthrough time.
Suitable are, e.g., safety gloves from KCL GmbH Co., D-36124
Eichenzell, e-mail vertrieb@kcl.de, following specifications:
Product name/part number:
Combi - Latex / 395, 403
Combi - Rutschni / 465
Lapren / 706, Cama Clean / 708
Camapren / 720, 722, 726, Tricopren / 723, 725

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Camatril + Camatril Velour / 730, 732, 733, 735
Vitoject / 890
Butoject / 898

Skin protection - Other:
Protective working garments (e.g. safety shoes EN ISO 20345, long-sleeved protective working garments)

Respiratory protection:
Normally not necessary.
On vapour formation:
Filter A P 3 (EN 14387), code colour brown, white

Thermal hazards:
If applicable, these are included in the individual protective measures (eye/face protection, skin protection, respiratory protection).

Additional information on hand protection - No tests have been performed.
In the case of mixtures, the selection has been made according to the knowledge available and the information about the contents.
Selection of materials derived from glove manufacturer's indications.
Final selection of glove material must be made taking the breakthrough times, permeation rates and degradation into account.
Selection of a suitable glove depends not only on the material but also on other quality characteristics and varies from manufacturer to manufacturer.
In the case of mixtures, the resistance of glove materials cannot be predicted and must therefore be tested before use.
The exact breakthrough time of the glove material can be requested from the protective glove manufacturer and must be observed.

8.2.3 Environmental exposure controls

No information available at present.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state:	Liquid
Colour:	Clear
Colour:	Colourless
Odour:	Characteristic
Odour threshold:	Not determined
pH-value:	Not determined
Melting point/freezing point:	Not determined
Initial boiling point and boiling range:	Not determined
Flash point:	Not determined
Evaporation rate:	Not determined
Flammability (solid, gas):	Not determined
Lower explosive limit:	Not determined
Upper explosive limit:	Not determined
Vapour pressure:	Not determined
Vapour density (air = 1):	Not determined
Density:	1-1,2 g/ml
Bulk density:	Not determined
Solubility(ies):	Not determined
Water solubility:	Soluble
Partition coefficient (n-octanol/water):	-0,82 (References Formamide, Log Pow (exp.))
Auto-ignition temperature:	Not determined
Decomposition temperature:	Not determined
Viscosity:	Not determined
Explosive properties:	Not determined
Oxidising properties:	Not determined

9.2 Other information

Miscibility:	Not determined
Fat solubility / solvent:	Not determined
Conductivity:	Not determined
Surface tension:	Not determined
Solvents content:	Not determined

SECTION 10: Stability and reactivity

10.1 Reactivity

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See also Subsection 10.4 to 10.6.
The product has not been tested.

10.2 Chemical stability

See also Subsection 10.4 to 10.6.
Stable with proper storage and handling.

10.3 Possibility of hazardous reactions

See also Subsection 10.4 to 10.6.

10.4 Conditions to avoid

See also section 7.
Effects of light as well as warmth.

10.5 Incompatible materials

See also section 7.
Avoid contact with oxidizing agents.

10.6 Hazardous decomposition products

See also Subsection 10.4 to 10.6.
See also section 5.2

SECTION 11: Toxicological information

Possibly more information on health effects, see Section 2.1 (classification).

Negative Control						
Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Acute toxicity, by oral route:						n.d.a.
Acute toxicity, by dermal route:						n.d.a.
Acute toxicity, by inhalation:						n.d.a.
Skin corrosion/irritation:						n.d.a.
Serious eye damage/irritation:						n.d.a.
Respiratory or skin sensitisation:						n.d.a.
Germ cell mutagenicity:						n.d.a.
Carcinogenicity:						n.d.a.
Reproductive toxicity:						n.d.a.
Specific target organ toxicity - single exposure (STOT-SE):						n.d.a.
Specific target organ toxicity - repeated exposure (STOT-RE):						n.d.a.
Aspiration hazard:						n.d.a.
Respiratory tract irritation:						n.d.a.
Repeated dose toxicity:						n.d.a.
Symptoms:						n.d.a.
Other information:						Classification according to calculation procedure.

Formamide						
Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Acute toxicity, by oral route:	LD50	5800	mg/kg	Rat		
Acute toxicity, by dermal route:	LD50	17000	mg/kg	Rabbit		
Acute toxicity, by inhalation:	LC50	>7,3	mg/l/6h	Rat		
Skin corrosion/irritation:				Rabbit		Not irritant
Respiratory or skin sensitisation:						Not sensitising
Germ cell mutagenicity:					OECD 471 (Bacterial Reverse Mutation Test)	Negative
Reproductive toxicity:						May cause harm to the unborn child.
Symptoms:						ataxia, breathing difficulties, headaches, gastrointestinal disturbances, mucous membrane irritation, dizziness, nausea

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SECTION 12: Ecological information

Possibly more information on environmental effects, see Section 2.1 (classification).

Negative Control							
Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Toxicity to fish:							n.d.a.
Toxicity to daphnia:							n.d.a.
Toxicity to algae:							n.d.a.
Persistence and degradability:							n.d.a.
Bioaccumulative potential:							n.d.a.
Mobility in soil:							n.d.a.
Results of PBT and vPvB assessment							n.d.a.
Other adverse effects:							n.d.a.

Formamide							
Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Toxicity to fish:	LC50	96h	4600-9300	mg/l	(Leuciscus idus)		
Toxicity to daphnia:	EC50	48h	>500	mg/l	(Daphnia magna)		
Toxicity to algae:	IC50	72h	>500	mg/l			
Persistence and degradability:		28d	>70	%		Zahn-Wellens-Test	
Toxicity to bacteria:	EC50	17h	>10000	mg/l	(Pseudomonas putida)		

SECTION 13: Disposal considerations

13.1 Waste treatment methods

For the substance / mixture / residual amounts

EC disposal code no.:

The waste codes are recommendations based on the scheduled use of this product.

Owing to the user's specific conditions for use and disposal, other waste codes may be allocated under certain circumstances. (2001/118/EC, 2001/119/EC, 2001/573/EC)

16 05 06 laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals

16 05 08 discarded organic chemicals consisting of or containing dangerous substances

Recommendation:

Pay attention to local and national official regulations

E.g. suitable incineration plant.

E.g. dispose at suitable refuse site.

For contaminated packing material

Pay attention to local and national official regulations

Empty container completely.

Uncontaminated packaging can be recycled.

Dispose of packaging that cannot be cleaned in the same manner as the substance.

SECTION 14: Transport information

General statements

UN number: n.a.

Transport by road/by rail (ADR/RID)

UN proper shipping name:

Transport hazard class(es): n.a.

Packing group: n.a.

Classification code: n.a.

LQ (ADR 2011): n.a.

LQ (ADR 2009): n.a.

Environmental hazards: Not applicable

Tunnel restriction code:

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Transport by sea (IMDG-code)

UN proper shipping name:
Transport hazard class(es): n.a.
Packing group: n.a.
Marine Pollutant: n.a.
Environmental hazards: Not applicable

Transport by air (IATA)

UN proper shipping name:
Transport hazard class(es): n.a.
Packing group: n.a.
Environmental hazards: Not applicable

Special precautions for user

Unless specified otherwise, general measures for safe transport must be followed.

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

Non-dangerous material according to Transport Regulations.

SECTION 15: Regulatory information

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

For classification and labelling see Section 2.

Observe restrictions: Yes

Comply with trade association/occupational health regulations.

Observe regulations on prohibition of chemicals.

Observe youth employment law (German regulation).

Observe law on protection of expectant mothers (German regulation).

Regulation (EC) No 1907/2006, Annex XVII

Formamide

VOC 1999/13/EC ---

15.2 Chemical safety assessment

A chemical safety assessment is not provided for mixtures.

SECTION 16: Other information

These details refer to the product as it is delivered.

Revised sections: 3

M 017, M 039, M 053

The following statements are the indicated R-phrases / H-phrases and classification codes (GHS/CLP) for the ingredients (listed in Section 3).

61 May cause harm to the unborn child.

H360D May damage the unborn child.

Repr.-Reproductive toxicity

Any abbreviations and acronyms used in this document:

AC Article Categories

acc., acc. to according, according to

ACGIH American Conference of Governmental Industrial Hygienists

ADR Accord européen relatif au transport international des marchandises Dangereuses par Route (= European Agreement concerning the International Carriage of Dangerous Goods by Road)

AOEL Acceptable Operator Exposure Level

AOX Adsorbable organic halogen compounds

approx. approximately

Art., Art. no. Article number

ATE Acute Toxicity Estimate according to Regulation (EC) 1272/2008 (CLP)

BAM Bundesanstalt für Materialforschung und -prüfung (Federal Institute for Materials Research and Testing, Germany)

BAuA Bundesanstalt für Arbeitsschutz und Arbeitsmedizin (= Federal Institute for Occupational Health and Safety, Germany)

BCF Bioconcentration factor

BGV Berufsgenossenschaftliche Vorschrift (= Accident Prevention Regulation)

BHT Butylhydroxytoluol (= 2,6-Di-t-butyl-4-methyl-phenol)

BMGV Biological monitoring guidance value (EH40, UK)

BOD Biochemical oxygen demand

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BSEF Bromine Science and Environmental Forum
bw body weight
CAS Chemical Abstracts Service
CESIO Comité Européen des Agents de Surface et de leurs Intermédiaires Organiques
CIPAC Collaborative International Pesticides Analytical Council
CLP Classification, Labelling and Packaging (REGULATION (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures)
CMR carcinogenic, mutagenic, reproductive toxic
COD Chemical oxygen demand
CTFA Cosmetic, Toiletry, and Fragrance Association
DMEL Derived Minimum Effect Level
DNEL Derived No Effect Level
DOC Dissolved organic carbon
DT50 Dwell Time - 50% reduction of start concentration
DVS Deutscher Verband für Schweißen und verwandte Verfahren e.V. (= German Association for Welding and Allied Processes)
dw dry weight
e.g. for example (abbreviation of Latin 'exempli gratia'), for instance
EC European Community
ECHA European Chemicals Agency
EEA European Economic Area
EEC European Economic Community
EINECS European Inventory of Existing Commercial Chemical Substances
ELINCS European List of Notified Chemical Substances
EN European Norms
EPA United States Environmental Protection Agency (United States of America)
ERC Environmental Release Categories
ES Exposure scenario
etc. et cetera
EU European Union
EWC European Waste Catalogue
Fax. Fax number
gen. general
GHS Globally Harmonized System of Classification and Labelling of Chemicals
GWP Global warming potential
HET-CAM Hen's Egg Test - Chorionallantoic Membrane
HGWP Halocarbon Global Warming Potential
IARC International Agency for Research on Cancer
IATA International Air Transport Association
IBC Intermediate Bulk Container
IBC (Code) International Bulk Chemical (Code)
IC Inhibitory concentration
IMDG-code International Maritime Code for Dangerous Goods
incl. including, inclusive
IUCLID International Uniform Chemical Information Database
LC lethal concentration
LC50 lethal concentration 50 percent kill
LCLo lowest published lethal concentration
LD Lethal Dose of a chemical
LD50 Lethal Dose, 50% kill
LDLo Lethal Dose Low
LOAEL Lowest Observed Adverse Effect Level
LOEC Lowest Observed Effect Concentration
LOEL Lowest Observed Effect Level
LQ Limited Quantities
MARPOL International Convention for the Prevention of Marine Pollution from Ships
n.a. not applicable
n.av. not available
n.c. not checked
n.d.a. no data available
NIOSH National Institute of Occupational Safety and Health (United States of America)
NOAEC No Observed Adverse Effective Concentration
NOAEL No Observed Adverse Effect Level
NOEC No Observed Effect Concentration
NOEL No Observed Effect Level
ODP Ozone Depletion Potential
OECD Organisation for Economic Co-operation and Development
org. organic

GB

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PAH polycyclic aromatic hydrocarbon
PBT persistent, bioaccumulative and toxic
PC Chemical product category
PE Polyethylene
PNEC Predicted No Effect Concentration
POCP Photochemical ozone creation potential
ppm parts per million
PROC Process category
PTFE Polytetrafluorethylene
REACH Registration, Evaluation, Authorisation and Restriction of Chemicals (REGULATION (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals)
REACH-IT List-No. 9xx-xxx-x No. is automatically assigned, e.g. to pre-registrations without a CAS No. or other numerical identifier. List Numbers do not have any legal significance, rather they are purely technical identifiers for processing a submission via REACH-IT.
RID Règlement concernant le transport International ferroviaire de marchandises Dangereuses (= Regulation concerning the International Carriage of Dangerous Goods by Rail)
SADT Self-Accelerating Decomposition Temperature
SAR Structure Activity Relationship
SU Sector of use
SVHC Substances of Very High Concern
Tel. Telephone
ThOD Theoretical oxygen demand
TOC Total organic carbon
TRGS Technische Regeln für Gefahrstoffe (=Technical Regulations for Hazardous Substances)
VbF Verordnung über brennbare Flüssigkeiten (= Regulation for flammable liquids (Austria))
VOC Volatile organic compounds
vPvB very persistent and very bioaccumulative
WEL-TWA, WEL-STEL WEL-TWA = Workplace Exposure Limit - Long-term exposure limit (8-hour TWA (= time weighted average) reference period), WEL-STEL = Workplace Exposure Limit - Short-term exposure limit (15-minute reference period) (EH40, UK).
WHO World Health Organization
wwt wet weight

The statements made here should describe the product with regard to the necessary safety precautions - they are not meant to guarantee definite characteristics - but they are based on our present up-to-date knowledge.
No responsibility.

These statements were made by:

Chemical Check GmbH, Wöbbeler Straße 2-4, D-32839 Steinheim, Tel.: +49 5233 94 17 0, Fax: +49 5233 94 17 90

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Safety data sheet according to Regulation (EC) No 1907/2006, Annex II

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

1.1 Product identifier

Solution D1
Solution D101B
Solution D1B
Solution D2
Solution D3
Solution D4
Solution D42
Solution D5
Solution D5B
Solution D6
Solution D62
Solution D7

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

Relevant identified uses of the substance or mixture:

Sector of use [SU]:

SU 3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

SU 4 - Manufacture of food products

SU24 - Scientific research and development

Chemical product category [PC]:

PC21 - Laboratory chemicals

Process category [PROC]:

PROC15 - Use a laboratory reagent.

Environmental Release Category [ERC]:

ERC99 - Not required.

Article Categories [AC]:

AC99 - Not required.

Uses advised against:

No information available at present.

1.3 Details of the supplier of the safety data sheet

vermicon AG, Emmy-Noether-Str. 2, D-80992 München
Telephone +49 (0)89 1 58 82-0, Fax +49 (0)89 1 58 82-1 00

E-mail address of the competent person: info@chemical-check.de, k.schnurbusch@chemical-check.de

1.4 Emergency telephone

Advisory office in case of poisoning:

Telephone number of the company in case of emergencies:

Tel.: +49 (0)89 1 58 82-0

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) 1272/2008 (CLP)

Not determined

2.1.2 Classification according to Directives 67/548/EEC and 1999/45/EC (including amendments).

The mixture is not classified as dangerous in the terms of the directive 1999/45/EC.

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2.2 Label elements

2.2.1 Labeling according to Regulation (EC) 1272/2008 (CLP)

Not determined

2.2.2 Labeling according to Directives 67/548/EEC and 1999/45/EC (including amendments).

Symbols: Not applicable
 Indications of danger: --
 R-phrases:

S-phrases:

Additions:
 Safety data sheet available for professional user on request.

2.3 Other hazards

The mixture contains no vPvB substance (vPvB = very persistent, very bioaccumulative).
 The mixture contains no PBT substance (PBT = persistent, bioaccumulative, toxic).

SECTION 3: Composition/information on ingredients

3.1 Substance

n.a.

3.2 Mixture

trometamol	
Registration number (ECHA)	-
Index	---
EINECS, ELINCS	201-064-4
CAS	CAS 77-86-1
content %	1-5
Symbol	Xi
R-phrases	36/38
Classification categories / Indications of danger	Irritant
Hazard class/Hazard category	Hazard statement
Eye Irrit./2	H319
Skin Irrit./2	H315

ethylenediaminetetraacetate, disodium salt	
Registration number (ECHA)	-
Index	---
EINECS, ELINCS	205-358-3
CAS	CAS 6381-92-6
content %	1-5
Symbol	Xn
R-phrases	22
Classification categories / Indications of danger	Harmful
Hazard class/Hazard category	Hazard statement
Acute Tox./4	H302

For the text of the R-phrases / H-phrases and classification codes (GHS/CLP), see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation

Remove person from danger area.
 Supply person with fresh air and consult doctor according to symptoms.

Skin contact

Wash thoroughly using copious water - remove contaminated clothing immediately.

Eye contact

Wash thoroughly for several minutes using copious water. Seek medical help if necessary.

Ingestion

Rinse the mouth thoroughly with water.
 In case of symptoms:
 Medical attention necessary.

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4.2 Most important symptoms and effects, both acute and delayed

Where relevant delayed occurring symptoms and effects will be found in section 11. or at the exposure routes under section 4.1.

4.3 Indication of any immediate medical attention and special treatment needed

n.c.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Adapt to the nature and extent of fire.

Product is not combustible.

Unsuitable extinguishing media

n.c.

5.2 Special hazards arising from the substance or mixture

In case of fire the following can develop:

Oxides of carbon

Oxides of nitrogen

5.3 Advice for firefighters

Protective respirator with independent air supply.

According to size of fire

Full protection, if necessary

Dispose of contaminated extinction water according to official regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

If applicable, caution - risk of slipping

Avoid contact with eyes or skin.

6.2 Environmental precautions

Do not pour down the drain undiluted.

If leakage occurs, dam up.

Prevent surface and ground-water infiltration, as well as ground penetration.

6.3 Methods and material for containment and cleaning up

Soak up with absorbent material (e.g. universal binding agent) and dispose of according to Section 13.

6.4 Reference to other sections

For personal protective equipment see Section 8 and for disposal instructions see Section 13.

SECTION 7: Handling and storage

In addition to information given in this section, relevant information can also be found in section 8 and 6.1.

7.1 Precautions for safe handling

Observe directions on label and instructions for use.

General hygiene measures for the handling of chemicals are applicable.

Wash hands before breaks and at end of work.

Keep away from food, drink and animal feedingstuffs.

Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

7.2 Conditions for safe storage, including any incompatibilities

Not to be stored in gangways or stair wells.

Store product closed and only in original packing.

Store in a dry place.

Protect from direct sunlight.

Only store at temperatures from 15°C to 25°C.

7.3 Specific end use(s)

No information available at present.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

8.2.1 Appropriate engineering controls

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 Solution D1

8.2.2 Individual protection measures, such as personal protective equipment

General hygiene measures for the handling of chemicals are applicable.

Wash hands before breaks and at end of work.

Keep away from food, drink and animal feedingstuffs.

Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

Eye/face protection:

Tight fitting protective goggles (EN 166) with side protection, with danger of projections.

Skin protection - Hand protection:

Recommended

Protective hand cream recommended.

Safety gloves made of natural rubber latex (EN 374).

Safety gloves made of chloroprene (EN 374).

Protective nitrile gloves (EN 374)

Safety gloves made of vinyl (EN 374)

Safety gloves made of butyl (EN 374)

Permeation time (penetration time) in minutes:

> 480

The recommended maximum wearing time is 50% of breakthrough time.

Suitable are, e.g., safety gloves from KCL GmbH Co., D-36124

Eichenzell, e-mail vertrieb@kcl.de, following specifications:

Product name/part number:

Combi - Latex / 395, 403

Combi - Rutschni / 465

Lapren / 706, Cama Clean / 708

Camapren / 720, 722, 726, Tricopren / 723, 725

Camatril + Camatril Velour / 730, 732, 733, 735

Dermatril / 740, 741

Vitoject / 890

Butoject / 898

Skin protection - Other:

Protective working garments (e.g. safety shoes EN ISO 20345, long-sleeved protective working garments)

Respiratory protection:

Normally not necessary.

Thermal hazards:

If applicable, these are included in the individual protective measures (eye/face protection, skin protection, respiratory protection).

Additional information on hand protection - No tests have been performed.

In the case of mixtures, the selection has been made according to the knowledge available and the information about the contents.

Selection of materials derived from glove manufacturer's indications.

Final selection of glove material must be made taking the breakthrough times, permeation rates and degradation into account.

Selection of a suitable glove depends not only on the material but also on other quality characteristics and varies from manufacturer to manufacturer.

In the case of mixtures, the resistance of glove materials cannot be predicted and must therefore be tested before use.

The exact breakthrough time of the glove material can be requested from the protective glove manufacturer and must be observed.

8.2.3 Environmental exposure controls

No information available at present.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state:	Liquid
Colour:	Clear
Colour:	Colourless
Odour:	Odourless
Odour threshold:	Not determined
pH-value:	Not determined
Melting point/freezing point:	Not determined
Initial boiling point and boiling range:	100 °C
Flash point:	Not determined
Evaporation rate:	Not determined
Flammability (solid, gas):	Not determined
Lower explosive limit:	Not determined
Upper explosive limit:	Not determined
Vapour pressure:	Not determined
Vapour density (air = 1):	Not determined
Density:	1-1,1 g/ml
Bulk density:	Not determined

Solubility(ies):	Not determined
Water solubility:	Mixable
Partition coefficient (n-octanol/water):	Not determined
Auto-ignition temperature:	Not determined
Decomposition temperature:	Not determined
Viscosity:	Not determined
Explosive properties:	Not determined
Oxidising properties:	Not determined

9.2 Other information

Miscibility:	Not determined
Fat solubility / solvent:	Not determined
Conductivity:	Not determined
Surface tension:	Not determined
Solvents content:	Not determined

SECTION 10: Stability and reactivity

10.1 Reactivity

See also Subsection 10.4 to 10.6.

The product has not been tested.

10.2 Chemical stability

See also Subsection 10.4 to 10.6.

Stable with proper storage and handling.

10.3 Possibility of hazardous reactions

See also Subsection 10.4 to 10.6.

10.4 Conditions to avoid

See also section 7.

Effects of light as well as warmth.

10.5 Incompatible materials

See also section 7.

Avoid contact with other chemicals.

10.6 Hazardous decomposition products

See also Subsection 10.4 to 10.6.

See also section 5.3

SECTION 11: Toxicological information

No classification according to calculation procedure.

According to current knowledge that mixture does not endanger man under normal conditions of application.

Solution D1						
Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Acute toxicity, by oral route:				---		n.d.a.
Acute toxicity, by dermal route:				---		n.d.a.
Acute toxicity, by inhalation:				---		n.d.a.
Skin corrosion/irritation:				---		n.d.a.
Serious eye damage/irritation:				---		n.d.a.
Respiratory or skin sensitisation:				---		n.d.a.
Germ cell mutagenicity:				---		n.d.a.
Carcinogenicity:				---		n.d.a.
Reproductive toxicity:				---		n.d.a.
Specific target organ toxicity - single exposure (STOT-SE):				---		n.d.a.
Specific target organ toxicity - repeated exposure (STOT-RE):				---		n.d.a.
Aspiration hazard:				---		n.d.a.
Respiratory tract irritation:				---		n.d.a.
Repeated dose toxicity:				---		n.d.a.
Symptoms:				---		n.d.a.

trometamol						
Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Acute toxicity, by oral route:	LD50	5900	mg/kg	Rat		
Skin corrosion/irritation:				---		Irritant
Serious eye damage/irritation:				---		Irritant

Symptoms:				---		vomiting, cramps, mucous membrane irritation, nausea, mental confusion
-----------	--	--	--	-----	--	---

ethylenediaminetetraacetate, disodium salt						
Toxicity/effect	Endpoint	Value	Unit	Organism	Test method	Notes
Acute toxicity, by oral route:	LD50	2000	mg/kg	Rat		

SECTION 12: Ecological information

According to the recipe, contains no AOX.

Solution D1							
Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Toxicity to fish:							n.d.a.
Toxicity to daphnia:							n.d.a.
Toxicity to algae:							n.d.a.
Persistence and degradability:							n.d.a.
Bioaccumulative potential:							n.d.a.
Mobility in soil:							n.d.a.
Results of PBT and vPvB assessment							n.d.a.
Other adverse effects:							n.d.a.

trometamol							
Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Persistence and degradability:		28d	89	%		OECD 301 D (Ready Biodegradability - Closed Bottle Test)	Analogous conclusion
Bioaccumulative potential:				mg/l			Not accepted due to the log Pow - value.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

For the substance / mixture / residual amounts

EC disposal code no.:

The waste codes are recommendations based on the scheduled use of this product.

Owing to the user's specific conditions for use and disposal, other waste codes may be allocated under certain circumstances. (2001/118/EC, 2001/119/EC, 2001/573/EC)

16 05 06 laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals

Recommendation:

Pay attention to local and national official regulations

E.g. dispose at suitable refuse site.

E.g. suitable incineration plant.

For contaminated packing material

Pay attention to local and national official regulations

Empty container completely.

Uncontaminated packaging can be recycled.

Dispose of packaging that cannot be cleaned in the same manner as the substance.

SECTION 14: Transport information

General statements

UN number: n.a.

Transport by road/by rail (ADR/RID)

UN proper shipping name:

Transport hazard class(es): n.a.

Packing group: n.a.

Classification code: n.a.

LQ (ADR 2011): n.a.

LQ (ADR 2009): n.a.

Environmental hazards: Not applicable

Tunnel restriction code:

Transport by sea (IMDG-code)

UN proper shipping name:

Transport hazard class(es):

n.a.

Packing group:

n.a.

Marine Pollutant:

n.a.

Environmental hazards:

Not applicable

Transport by air (IATA)

UN proper shipping name:

Transport hazard class(es):

n.a.

Packing group:

n.a.

Environmental hazards:

Not applicable

Special precautions for user

Unless specified otherwise, general measures for safe transport must be followed.

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

Non-dangerous material according to Transport Regulations.

Additional information:

Non-dangerous material according to Transport Regulations.

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

For classification and labelling see Section 2.

Observe restrictions:

n.a.

VOC 1999/13/EC < 1% w/w

15.2 Chemical safety assessment

No information available at present.

SECTION 16: Other information

These details refer to the product as it is delivered.

Revised sections:

1 - 16

The following statements are the indicated R-phrases / H-phrases and classification codes (GHS/CLP) for the ingredients (listed in Section 3).

36/38 Irritating to eyes and skin.

22 Harmful if swallowed.

H302 Harmful if swallowed.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

Eye Irrit.-Eye irritation

Skin Irrit.-Skin irritation

Acute Tox.-Acute toxicity - oral

Legend:

n.a. = not applicable / n.v., k.D.v. = n.av. = not available / n.g. = n.c. = not checked

WEL = Workplace Exposure Limit EH40, TWA = Long-term exposure limit (8-hour TWA (= time weighted average) reference period), STEL = Short-term exposure limit (15-minute reference period) / BMGV = Biological monitoring guidance value EH40

AGW = "Arbeitsplatzgrenzwert" (workplace limit value, Germany) / BGW = "Biologischer Grenzwert" (biological limit value, Germany)

VbF = Regulations for flammable liquids (Austria)

VOC = Volatile organic compounds

AOX = Adsorbable organic halogen compounds

ATE = Acute Toxicity Estimates according to Regulation (EC) 1272/2008 (CLP)

The statements made here should describe the product with regard to the necessary safety precautions - they are not meant to guarantee definite characteristics - but they are based on our present up-to-date knowledge.

No responsibility.

These statements were made by:

Chemical Check GmbH, Wöbbeler Straße 2-4, D-32839 Steinheim, Tel.: +49 5233 94 17 0, +49 1805-CHEMICAL / +49 180 52 43 642, Fax: +49 5233 94 17 90, +49 180 50 50 455

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Safety data sheet according to Regulation (EC) No 1907/2006, Annex II

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

1.1 Product identifier

Finisher
Finisher S

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

Relevant identified uses of the substance or mixture:

Sector of use [SU]:

SU 3 - Industrial uses: Uses of substances as such or in preparations at industrial sites

SU 4 - Manufacture of food products

SU24 - Scientific research and development

Chemical product category [PC]:

PC21 - Laboratory chemicals

Process category [PROC]:

PROC15 - Use a laboratory reagent.

Environmental Release Category [ERC]:

ERC99 - Not required.

Article Categories [AC]:

AC99 - Not required.

Uses advised against:

No information available at present.

1.3 Details of the supplier of the safety data sheet

vermicon AG, Emmy-Noether-Str. 2, D-80992 München
Telephone +49 (0)89 1 58 82-0, Fax +49 (0)89 1 58 82-1 00

E-mail address of the competent person: info@chemical-check.de, k.schnurbusch@chemical-check.de

1.4 Emergency telephone

Advisory office in case of poisoning:

Telephone number of the company in case of emergencies:

Tel.: +49 (0)89 1 58 82-0

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) 1272/2008 (CLP)

Not determined

2.1.2 Classification according to Directives 67/548/EEC and 1999/45/EC (including amendments).

The mixture is not classified as dangerous in the terms of the directive 1999/45/EC.

2.2 Label elements

2.2.1 Labeling according to Regulation (EC) 1272/2008 (CLP)

Not determined

2.2.2 Labeling according to Directives 67/548/EEC and 1999/45/EC (including amendments).

Symbols: Not applicable

Indications of danger: ---

R-phrases:

S-phrases:

Voluntary:

2 Keep out of the reach of children.

26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Additions:
 Safety data sheet available for professional user on request.

2.3 Other hazards

The mixture contains no vPvB substance (vPvB = very persistent, very bioaccumulative).
 The mixture contains no PBT substance (PBT = persistent, bioaccumulative, toxic).

SECTION 3: Composition/information on ingredients

3.1 Substance

n.a.

3.2 Mixture

triethylenediamine	
Registration number (ECHA)	-
Index	---
EINECS, ELINCS	205-999-9
CAS	CAS 280-57-9
content %	1-<10
Symbol	Xn/Xi
R-phrases	22-36/38-52-53
Classification categories / Indications of danger	Dangerous for the environment, Harmful, Irritant
Hazard class/Hazard category	Hazard statement
Acute Tox./4	H302
Eye Irrit./2	H319
Skin Irrit./2	H315
Aquatic Chronic/3	H412

For the text of the R-phrases / H-phrases and classification codes (GHS/CLP), see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation

Supply person with fresh air and consult doctor according to symptoms.
 Respiratory arrest - Artificial respiration apparatus necessary.

Skin contact

Wash thoroughly using copious water - remove contaminated clothing immediately.

Eye contact

Wash thoroughly for several minutes using copious water. Seek medical help if necessary.

Ingestion

Rinse the mouth thoroughly with water.

In case of symptoms:

Medical attention necessary.

4.2 Most important symptoms and effects, both acute and delayed

Where relevant delayed occurring symptoms and effects will be found in section 11. or at the exposure routes under section 4.1.

The following may occur:

Irritation of the eyes

Irritation of the respiratory tract

Irritation of the skin.

Ingestion:

Product is dangerous to health.

Gastrointestinal disturbances

Nausea

Inhalation:

Coughing

4.3 Indication of any immediate medical attention and special treatment needed

There should be an eyewash station and safety shower located near the area of use.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Water jet spray

CO2

Dry extinguisher

Foam

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Unsuitable extinguishing media

n.c.

5.2 Special hazards arising from the substance or mixture

In case of fire the following can develop:

Oxides of carbon

Oxides of nitrogen

5.3 Advice for firefighters

Protective respirator with independent air supply.

According to size of fire

Full protection, if necessary

Dispose of contaminated extinction water according to official regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid inhalation, and contact with eyes or skin.

If air supply is not sufficient, wear protective breathing apparatus.

6.2 Environmental precautions

Do not pour down the drain undiluted.

Prevent surface and ground-water infiltration, as well as ground penetration.

6.3 Methods and material for containment and cleaning up

Soak up with absorbent material (e.g. sand, earth) and dispose of according to Section 13.

Ensure sufficient ventilation.

6.4 Reference to other sections

For personal protective equipment see Section 8 and for disposal instructions see Section 13.

SECTION 7: Handling and storage

In addition to information given in this section, relevant information can also be found in section 8 and 6.1.

7.1 Precautions for safe handling

Avoid inhalation, and contact with eyes or skin.

General hygiene measures for the handling of chemicals are applicable.

Wash hands before breaks and at end of work.

Keep away from food, drink and animal feedingstuffs.

Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

7.2 Conditions for safe storage, including any incompatibilities

Store product closed and only in original packing.

Not to be stored in gangways or stair wells.

Store in a dry place.

Protect from direct sunlight.

Store cool

7.3 Specific end use(s)

No information available at present.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Ensure good ventilation. This can be achieved by local suction or general air extraction.

If this is insufficient to maintain the concentration under the WEL or AGW values, suitable breathing protection should be worn.

Applies only if maximum permissible exposure values are listed here.

8.2.2 Individual protection measures, such as personal protective equipment

General hygiene measures for the handling of chemicals are applicable.

Wash hands before breaks and at end of work.

Keep away from food, drink and animal feedingstuffs.

Remove contaminated clothing and protective equipment before entering areas in which food is consumed.

Eye/face protection:

Tight fitting protective goggles (EN 166) with side protection, with danger of projections.

Skin protection - Hand protection:

Safety gloves made of natural rubber latex (EN 374).

Safety gloves made of chloroprene (EN 374).

Protective nitrile gloves (EN 374)

Safety gloves made of vinyl (EN 374)

Safety gloves made of butyl (EN 374)

Permeation time (penetration time) in minutes:

> 480

The recommended maximum wearing time is 50% of breakthrough time.

Suitable are, e.g., safety gloves from KCL GmbH Co., D-36124

Eichenzell, e-mail vertrieb@kcl.de, following specifications:

Product name/part number:

Combi - Latex / 395, 403

Combi - Rutschni / 465

Lapren / 706, Cama Clean / 708

Camapren / 720, 722, 726, Tricopren / 723, 725

Camatril + Camatril Velour / 730, 732, 733, 735

Dermatril / 740, 741

Vitoject / 890

Butoject / 898

Skin protection - Other:

Usual protective working garments

Respiratory protection:

If fumes build up, use suitable breathing mask.

Thermal hazards:

If applicable, these are included in the individual protective measures (eye/face protection, skin protection, respiratory protection).

Additional information on hand protection - No tests have been performed.

In the case of mixtures, the selection has been made according to the knowledge available and the information about the contents.

Selection of materials derived from glove manufacturer's indications.

Final selection of glove material must be made taking the breakthrough times, permeation rates and degradation into account.

Selection of a suitable glove depends not only on the material but also on other quality characteristics and varies from manufacturer to manufacturer.

In the case of mixtures, the resistance of glove materials cannot be predicted and must therefore be tested before use.

The exact breakthrough time of the glove material can be requested from the protective glove manufacturer and must be observed.

8.2.3 Environmental exposure controls

No information available at present.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state:	Liquid
Colour:	Colourless
Odour:	Slightly
Odour threshold:	Not determined
pH-value:	Not determined
Melting point/freezing point:	Not determined
Initial boiling point and boiling range:	182 °C
Flash point:	160 °C
Evaporation rate:	Not determined
Flammability (solid, gas):	Not determined
Lower explosive limit:	Not determined
Upper explosive limit:	Not determined
Vapour pressure:	Not determined
Vapour density (air = 1):	Not determined
Density:	Not determined
Bulk density:	Not determined
Solubility(ies):	Not determined
Water solubility:	Not determined
Partition coefficient (n-octanol/water):	Not determined
Auto-ignition temperature:	370 °C (Ignition temperature)
Decomposition temperature:	Not determined
Viscosity:	Not determined
Explosive properties:	Not determined
Oxidising properties:	Not determined

9.2 Other information

Miscibility:	Not determined
Fat solubility / solvent:	Not determined

Toxicity to daphnia:							n.d.a.
Toxicity to algae:							n.d.a.
Persistence and degradability:							n.d.a.
Bioaccumulative potential:							n.d.a.
Mobility in soil:							n.d.a.
Results of PBT and vPvB assessment							n.d.a.
Other adverse effects:							n.d.a.

triethylenediamine							
Toxicity/effect	Endpoint	Time	Value	Unit	Organism	Test method	Notes
Toxicity to daphnia:	EC50	48h	92	mg/l			
Persistence and degradability:		28d	7	%			

SECTION 13: Disposal considerations

13.1 Waste treatment methods

For the substance / mixture / residual amounts

EC disposal code no.:

The waste codes are recommendations based on the scheduled use of this product.

Owing to the user's specific conditions for use and disposal, other waste codes may be allocated under certain circumstances. (2001/118/EC, 2001/119/EC, 2001/573/EC)

16 05 06 laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals

Recommendation:

Pay attention to local and national official regulations

E.g. dispose at suitable refuse site.

E.g. suitable incineration plant.

For contaminated packing material

Pay attention to local and national official regulations

SECTION 14: Transport information

General statements

UN number: n.a.

Transport by road/by rail (ADR/RID)

UN proper shipping name:

Transport hazard class(es): n.a.

Packing group: n.a.

Classification code: n.a.

Hazard identification number: n.a.

LQ (ADR 2011): n.a.

LQ (ADR 2009): n.a.

Environmental hazards: Not applicable

Tunnel restriction code:

Transport by sea (IMDG-code)

UN proper shipping name:

Transport hazard class(es): n.a.

Packing group: n.a.

Marine Pollutant: n.a.

Environmental hazards: Not applicable

Transport by air (IATA)

UN proper shipping name:

Transport hazard class(es): n.a.

Packing group: n.a.

Environmental hazards: Not applicable

Special precautions for user

Unless specified otherwise, general measures for safe transport must be followed.

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

Non-dangerous material according to Transport Regulations.

Additional information:

Non-dangerous material according to Transport Regulations.

SECTION 15: Regulatory information

Safety data sheet according to Regulation (EC) No 1907/2006, Annex II

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

For classification and labelling see Section 2.

Observe restrictions:

n.a.

VOC 1999/13/EC k.D.v.

15.2 Chemical safety assessment

No information available at present.

SECTION 16: Other information

These details refer to the product as it is delivered.

Revised sections:

1 - 16

The following statements are the indicated R-phrases / H-phrases and classification codes (GHS/CLP) for the ingredients (listed in Section 3).

22 Harmful if swallowed.

36/38 Irritating to eyes and skin.

52 Harmful to aquatic organisms.

53 May cause long-term adverse effects in the aquatic environment.

H302 Harmful if swallowed.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H412 Harmful to aquatic life with long lasting effects.

Acute Tox.-Acute toxicity - oral

Eye Irrit.-Eye irritation

Skin Irrit.-Skin irritation

Aquatic Chronic-Hazardous to the aquatic environment - chronic

Legend:

n.a. = not applicable / n.v., k.D.v. = n.av. = not available / n.g. = n.c. = not checked

WEL = Workplace Exposure Limit EH40, TWA = Long-term exposure limit (8-hour TWA (= time weighted average) reference period), STEL = Short-term exposure limit (15-minute reference period) / BMGV = Biological monitoring guidance value EH40

AGW = "Arbeitsplatzgrenzwert" (workplace limit value, Germany) / BGW = "Biologischer Grenzwert" (biological limit value, Germany)

VbF = Regulations for flammable liquids (Austria)

VOC = Volatile organic compounds

AOX = Adsorbable organic halogen compounds

ATE = Acute Toxicity Estimates according to Regulation (EC) 1272/2008 (CLP)

The statements made here should describe the product with regard to the necessary safety precautions - they are not meant to guarantee definite characteristics - but they are based on our present up-to-date knowledge.

No responsibility.

These statements were made by:

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