

***Safety data sheet***  
***according to 1907/2006/EC, Article 31***



*Printing date: 21.12.2022*

*Version number 10 (replaces version 9)*

*Revision: 21.12.2022*

**Safety data sheet**

according to 1907/2006/EC, Article 31

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**Trade name: Black ruthenium conc. RU 1M, 25 g Ru/l****Schwarzrutheniumkonz. RU 1M, 25 g Ru/l****SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier**

· **Trade name:** Black ruthenium conc. RU 1M, 25 g Ru/l  
Schwarzrutheniumkonz. RU 1M, 25 g Ru/l

· **Article number:** 81011895

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**  
 Not approved for private consumers.

· **Application of the substance / the mixture** Galvanic bath

**1.3 Details of the supplier of the safety data sheet****Manufacturer/Supplier:**

Heimerle + Meule GmbH  
 Dennigstrasse 16  
 D-75179 Pforzheim

Telefon +49 (0) 7231 940-0  
 Telefax +49 (0) 7231 940-2199  
 www.heimerle-meule.com

**Further information obtainable from:**

Abteilung BASU - Bau/Arbeitssicherheit/Umwelt  
 Department BASU - Construction / Occupational Safety / Environment sds@heimerle-meule.com

LATA - 24h Emergency Contact - IATA - 24h Emergency Contact (Dangerous goods emergency number)  
 +49 172 739 6970

**1.4 Emergency telephone number:**

DEUTSCHLAND - GERMANY:

Vergiftungs-Informationen-Zentrale Freiburg, ++49 761 19240 (24 h)  
 (Poisoning Information Center)

GREAT BRITAIN:

National Poisons Information Service +44 121 507 4123

Members of the public seeking specific information on poisons should contact:

In England and Wales: NHS 111 - dial 111 - In Scotland: NHS 24 - dial 111

IRELAND

+353 1 809 2166 (7 Days 8 am -10 pm)

Healthcare Professionals: +353 1 809 2566

ITALY:

Istituto Superiore di Sanità (ISS) +3906499906140

Centro Antiveleni

Bergamo: +39 800 883300

Firenze +39 055 794 7819

Milano: +39 055 794 7819

Roma +39 06 68593726

Roma +39 06 49978000

Roma +39 06 3954343

KROATIA - REPUBLIKA HRVATSKA:

(+385) 01 2348 342

ESTLAND - ESTONIA:

Tervisemeti Mürgistusteabekeskuse

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*	<p>National (24/7): 16662  (+372) 7943 794  <u>LETTLAND - LATVIA:</u>  Valsts Toksikoloģijas centrs, Saindēšanās un zāļu informācijas centrs,</p> <p align="right">(Contd. on page 2)</p>
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(24h) 112

(24h) +371 67042473

LITAUEN - LIETUVOS RESPUBLIKA:

Poison Information Bureau (24/7), Tel.: +8 5 236 20 52

Apsinuodijimų informacijos biuras

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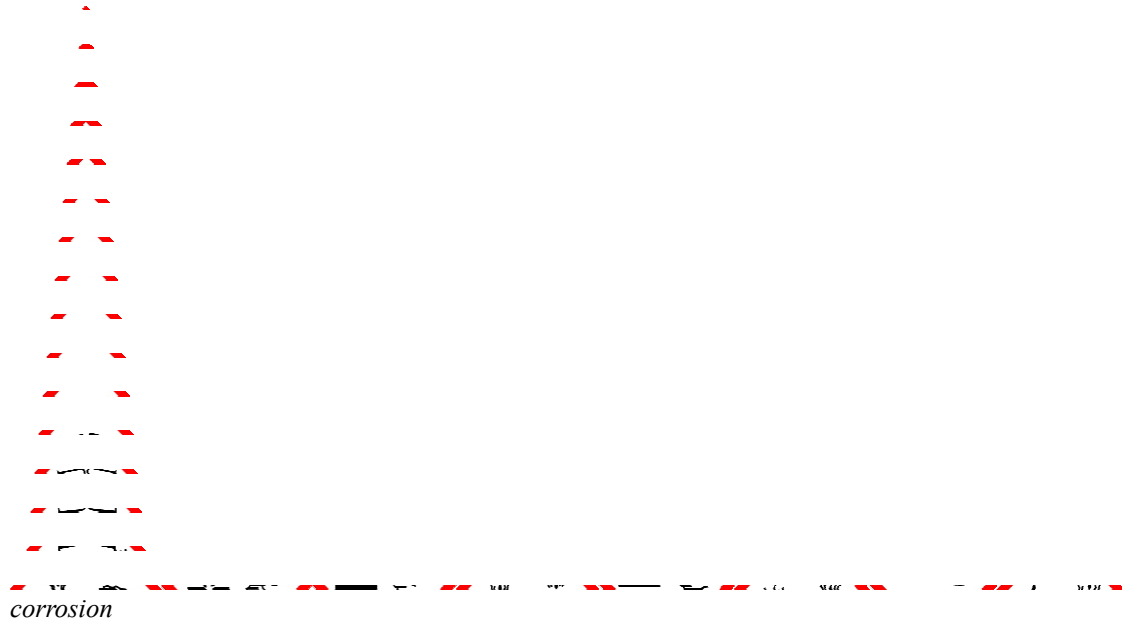
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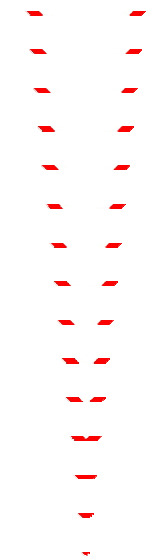
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## SECTION 2: Hazards identification

- 2.1 Classification of the substance or mixture
- Classification according to Regulation (EC) No 1272/2008



corrosion



Skin Corr. 1A H314 Causes severe skin burns and eye damage. Eye  
Dam. 1 H318 Causes serious eye damage.

- 
- 2.2 Label elements
  - Labelling according to Regulation (EC) No 1272/2008  
The product is classified and labelled according to the GB CLP regulation.
  - Hazard pictograms



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GHS05

· **Signal word** *Danger*· **Hazard-determining components of labelling:***sulphuric acid**Ruthenium trichloride*· **Hazard statements***H314 Causes severe skin burns and eye damage.*· **Precautionary statements***P260 Do not breathe dusts or mists.**P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].**P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.**P310 Immediately call a POISON CENTER/doctor.**P321 Specific treatment (see on this label).**P405 Store locked up.**P501 Dispose of contents/container in accordance with local/regional/national/international regulations.*· **2.3 Other hazards**· **Results of PBT and vPvB assessment**· **PBT:** Not applicable.· **vPvB:** Not applicable.

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Trade name: **Black ruthenium conc. RU 1M, 25 g Ru/l****SECTION 3: Composition/information on ingredients**· **3.2 Mixtures**· **Description:** Mixture of substances listed below with nonhazardous additions.· **Dangerous components / Information on ingredients:**

CAS: 7664-93-9 EINECS: 231-639-5 Index number: 016-020-00-8 Reg.nr.: 01-2119453338-20	sulphuric acid; sulfuric acid	<10%
	Met. Corr.1, H290; Skin Corr. 1A, H314 Specific concentration limits: Skin Corr. 1A; H314: $C \geq 15\%$ Skin Irrit. 2; H315: $5\% \leq C < 15\%$ Eye Irrit. 2; H319: $5\% \leq C < 15\%$	
CAS: 10049-08-8 EINECS: 233-167-5	Ruthenium trichloride	$\geq 2.5 - < 5\%$
	Skin Corr. 1B, H314	
CAS: 12125-02-9 EINECS: 235-186-4 Index number: 017-014-00-8 RTECS: BP 4550000 Reg.nr.: 01-2119487950-27	ammonium chloride	1–2.5%
	Acute Tox. 4, H302; Eye Irrit. 2, H319	
CAS: 50-99-7 EINECS: 200-075-1	glucose	$\geq 1 - < 2.5\%$
	Aquatic Chronic 3, H412	
CAS: 151-21-3 EINECS: 205-788-1 RTECS: WT 1050000	sodium dodecyl sulphate	0.5–1%
	Acute Tox. 4, H302; Acute Tox. 4, H312; Skin Irrit. 2, H315; Eye Irrit. 2, H319	

· **Additional information:** For the wording of the listed hazard phrases refer to section 16.**SECTION 4: First aid measures**· **4.1 Description of first aid measures**· **General information:**

Immediately remove any clothing soiled by the product.

Personal protection for the First Aider:

Take affected persons out of danger area and lay down.

Involve doctor immediately after an accident or unwell

· **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.· **After skin contact:**

Immediately wash with water and soap and rinse thoroughly.

Immediately rinse with water.

If skin irritation continues, consult a doctor.

· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.· **After swallowing:**

Drink plenty of water and provide fresh air. Call for a doctor immediately.

A person vomiting while laying on their back should be turned onto their side.

Rinse out mouth and then drink plenty of water.

· **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.· **Hazards** Danger of gastric perforation.· **4.3 Indication of any immediate medical attention and special treatment needed**

No further relevant information available.



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### SECTION 5: Firefighting measures

#### · 5.1 Extinguishing media

#### · Suitable extinguishing agents:

CO<sub>2</sub>, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

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· For safety reasons unsuitable extinguishing agents: Water with full jet ·

**5.2 Special hazards arising from the substance or mixture** In case of fire, the following can be released:

Sulphuric acid aerosol - sulfur oxides ·

**5.3 Advice for firefighters · Protective equipment:**

Wear self-contained respiratory protective device.

Beware: Filter masks provide protection for a short period of time only. They should only be used in exceptional cases, that is if a small amount of the substance has spilled out or in order to fight spillages and fire

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Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.

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

Mount respiratory protective device.

Wear protective equipment. Keep unprotected persons away.

Use respiratory protective device against the effects of fumes/dust/aerosol.

Only handle and refill product in closed systems.

**6.2 Environmental precautions:**

Dilute with plenty of water.

Do not allow to enter sewers/ surface or ground water.

**6.3 Methods and material for containment and cleaning up:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to item 13. Ensure adequate ventilation.

**6.4 Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

**SECTION 7: Handling and storage****7.1 Precautions for safe handling**

Keep receptacles tightly sealed.

Ensure good ventilation/exhaustion at the workplace.

The usual precautionary measures are to be adhered to when handling chemicals.

Prevent formation of aerosols.

Wear suitable respiratory protective device when decanting larger quantities without extractor facilities.

Do not dry clean dust covered objects and floors. Wash thoroughly with plenty of water.

**Information about fire - and explosion protection:** Keep respiratory protective device available.**7.2 Conditions for safe storage, including any incompatibilities****Storage:****Requirements to be met by storerooms and receptacles:**

Observe official regulations on storing packagings.

Observe official regulations on storing packagings. Prevent any seepage into the ground.

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· **Information about storage in one common storage facility:**

—  
 Store away from foodstuffs.

· **Further information about storage conditions:**

Keep container tightly sealed.

Store under lock and key and out of the reach of children.

· **Storage class:** 8 B

· **7.3 Specific end use(s)** No further relevant information available.

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## SECTION 8: Exposure controls/personal protection

### 8.1 Occupational exposure limit values that require monitoring at the workplace:

#### CAS: 7664-93-9 sulphuric acid

WEL (Great Britain)	Long-term value: 0.05* mg/m <sup>3</sup> *mist: defined as thoracic fraction
IOELV (European Union)	Long-term value: 0.05 mg/m <sup>3</sup>
AGW (Germany)	Long-term value: 0.1 E mg/m <sup>3</sup> I(I);DFG, EU, Y

#### CAS: 12125-02-9 ammonium chloride

WEL (Great Britain)	Short-term value: 20 mg/m <sup>3</sup> Long-term value: 10 mg/m <sup>3</sup>
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### Regulatory information

WEL (Great Britain): EH40/2020

IOELV (European Union): (EU) 2019/1831

AGW (Germany): TRGS 900

Additional information: The lists valid during the making were used as basis.

### 8.2 Exposure controls

Appropriate engineering controls No further data; see item 7.

Individual protection measures, such as personal protective equipment

General protective and hygienic measures:

The usual precautionary measures are to be adhered to when handling chemicals.

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing

Wash hands before breaks and at the end of work.

Do not inhale gases / fumes / aerosols.

Avoid contact with the eyes.

Avoid contact with the eyes and skin.

According to EC Directive 89/686/EEC

### Respiratory protection:

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.

Beware: Filter masks provide protection for a short period of time only. They should only be used in exceptional cases, that is if a small amount of the substance has spilled out or in order to fight spillages and fire.

according to EN 14387

according to EN 143

Recommended filter device for short term use: Combination filter B-P2

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· **Hand protection**



Protective gloves

according to EN 374

To avoid skin problems reduce the wearing of gloves to the required minimum.

Only use chemical-protective gloves with CE-labelling of category III.

Sensibilisation by the components in the glove materials is possible.

Check the permeability prior to each renewed use of the glove.

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Prior to working with gloves the rubbing in with tanniferous skin-protecting agents for the avoidance of skin softening due to perspiration is recommended.

· **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

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The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

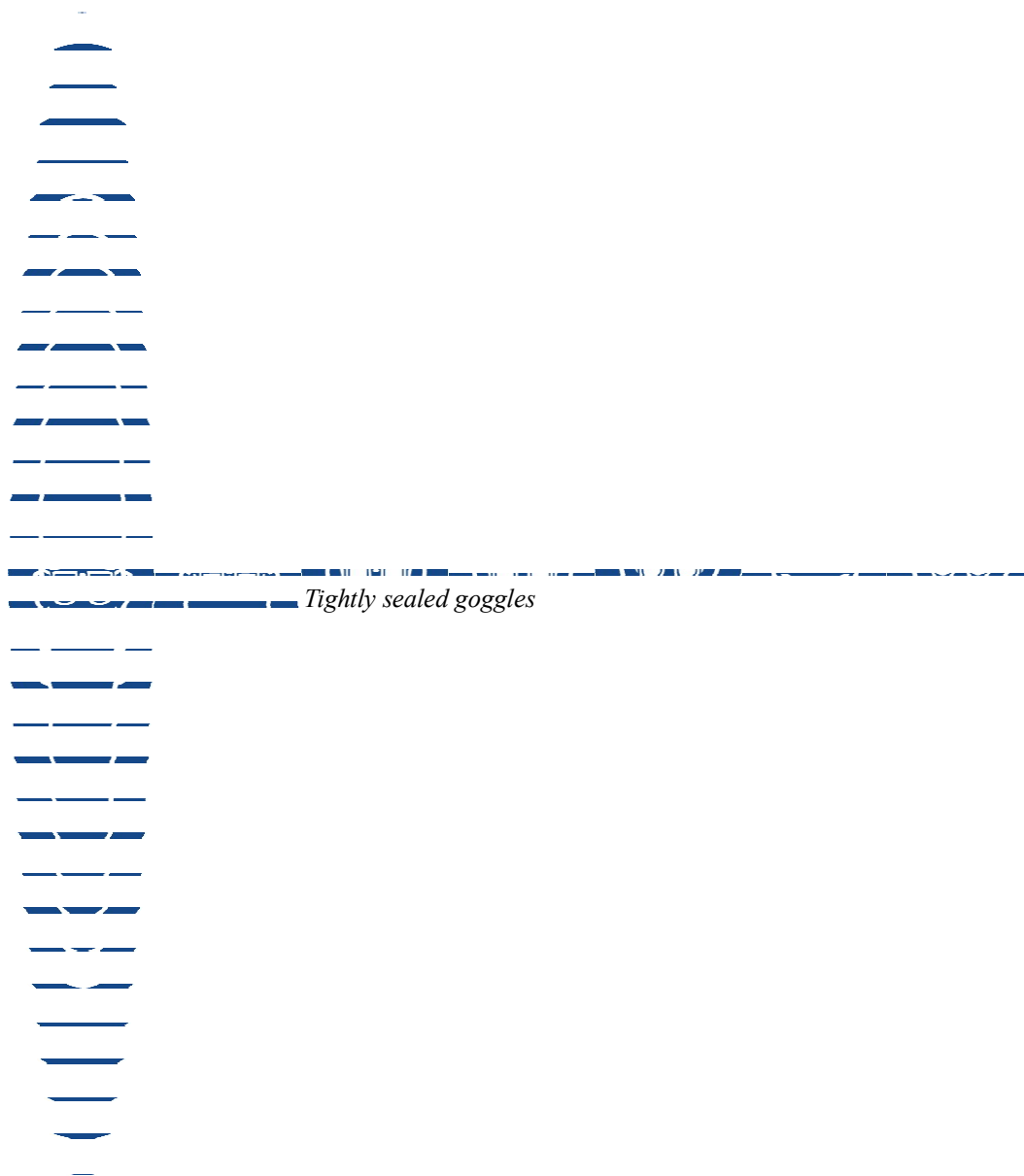
The determined penetration times according to EN 16523-1:2015 are not performed under practical conditions. Therefore a maximum wearing time, which corresponds to 50% of the penetration time, is recommended.

For the mixture of chemicals mentioned below the penetration time has to be at least 480 minutes (Permeation according to EN 374 Part 3: Level 3). Value for the permeation: Level ☐ 3

**· Not suitable are gloves made of the following materials:**

Leather gloves

Strong material gloves

**· Eye/face protection**

Tightly sealed goggles

according to EN 166

**· Body protection: Protective work clothing**

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### **SECTION 9: Physical and chemical properties**

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

· **General Information**

· <b>Physical state</b>	<i>Fluid</i>
· <b>Colour:</b>	<i>Brown</i>
· <b>Odour:</b>	<i>Irritant</i>
· <b>Odour threshold:</b>	<i>Not determined.</i>
· <b>Melting point/freezing point:</b>	<i>Undetermined.</i>

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· <b>Boiling point or initial boiling point and boiling range</b>	100°C (212°F)
· <b>Flammability</b>	Not applicable.
· <b>Lower and upper explosion limit</b>	
· <b>Lower:</b>	Not determined.
· <b>Upper:</b>	Not determined.
· <b>Flash point:</b>	Not applicable.
· <b>Decomposition temperature:</b>	Not determined.
· <b>pH at 20°C (68°F)</b>	1.3
· <b>Viscosity:</b>	
· <b>Kinematic viscosity</b>	Not determined.
· <b>Dynamic:</b>	Not determined.
· <b>Solubility</b>	
· <b>water:</b>	Fully miscible.
· <b>Partition coefficient n-octanol/water (log value)</b>	Not determined.
· <b>Vapour pressure:</b>	Not determined.
· <b>Density and/or relative density</b>	
· <b>Density at 20°C (68°F):</b>	1.13 g/cm <sup>3</sup> (9.43 lbs/gal)
· <b>Relative density</b>	Not determined.
· <b>Vapour density</b>	Not determined.
· <b>9.2 Other information</b>	
· <b>Appearance:</b>	
· <b>Form:</b>	Fluid
· <b>Important information on protection of health and environment, and on safety.</b>	
· <b>Auto-ignition temperature:</b>	Product is not selfigniting.
· <b>Explosive properties:</b>	Product does not present an explosion hazard.
· <b>Change in condition</b>	
· <b>Evaporation rate</b>	Not determined.
· <b>Information with regard to physical hazard classes</b>	
· <b>Explosives</b>	Void
· <b>Flammable gases</b>	Void
· <b>Aerosols</b>	Void
· <b>Oxidising gases</b>	Void
· <b>Gases under pressure</b>	Void
· <b>Flammable liquids</b>	Void
· <b>Flammable solids</b>	Void
· <b>Self-reactive substances and mixtures</b>	Void
· <b>Pyrophoric liquids</b>	Void
· <b>Pyrophoric solids</b>	Void
· <b>Self-heating substances and mixtures</b>	Void
· <b>Substances and mixtures, which emit flammable gases in contact with water</b>	Void
· <b>Oxidising liquids</b>	Void
· <b>Oxidising solids</b>	Void
· <b>Organic peroxides</b>	Void
· <b>Corrosive to metals</b>	Void
· <b>Desensitised explosives</b>	Void

### SECTION 10: Stability and reactivity

- **10.1 Reactivity** No further relevant information available.

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- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **10.3 Possibility of hazardous reactions** Reacts with acids, alkalis and oxidising agents.
- **10.4 Conditions to avoid** No further relevant information available.
- **10.5 Incompatible materials:** Reaktionen with metall
- **10.6 Hazardous decomposition products:** No dangerous decomposition products known.

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**SECTION 11: Toxicological information****11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008**

Oral	LD50	1,650 mg/kg (rat)
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**CAS: 151-21-3 sodium dodecyl sulphate**

Oral	LD50	1,288 mg/kg (rat)
Dermal	LD50	1,100 mg/kg (ATE)

**· Acute toxicity****· LD/LC50 values relevant for classification:****ATE (Acute Toxicity Estimates)**

Oral	LD50	47,399 mg/kg (rat)
Dermal	LD50	110,000 mg/kg

- **Skin corrosion/irritation** Causes severe skin burns and eye damage.
- **Serious eye damage/irritation** Causes serious eye damage.
- **11.2 Information on other hazards**

**· Endocrine disrupting properties**

None of the ingredients is listed.

\*

**SECTION 12: Ecological information**

- **12.1 Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **12.2 Persistence and degradability** No further relevant information available.
- **12.3 Bioaccumulative potential** No further relevant information available.
- **12.4 Mobility in soil** No further relevant information available.
- **12.5 Results of PBT and vPvB assessment** Not applicable.
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Endocrine disrupting properties**  
The product does not contain substances with endocrine disrupting properties.
- **12.7 Other adverse effects**
- **Additional ecological information:**
- **General notes:**

Do not allow product to reach ground water, water course or sewage system.  
 Danger to drinking water if even small quantities leak into the ground.

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## SECTION 13: Disposal considerations

### · *Recommendation*

[illegible]

Figure 1. Schematic representation of the experimental design. The subjects were divided into two groups: the control group and the experimental group. The control group was divided into two subgroups: the control group and the control group. The experimental group was divided into two subgroups: the experimental group and the experimental group. The control group was divided into two subgroups: the control group and the control group. The experimental group was divided into two subgroups: the experimental group and the experimental group.

Must not be disposed together with household garbage. Do not allow product to

reach sewage system.

Figure 1 displays 16 line drawings of fish species, arranged in a 4x4 grid. The fish are drawn in a simple, stylized manner, showing their basic shapes and patterns. The fish are arranged in four rows and four columns. The first row shows four different species of fish, mostly with horizontal stripes. The second row shows four species, including some with vertical stripes and some with spots. The third row shows four species, including some with horizontal stripes and some with spots. The fourth row shows four species, including some with horizontal stripes and some with spots.

*Contact manufacturer for recycling information.*

· **Waste disposal key:**

*The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process.*

- **Uncleaned packaging:**

· **Recommendation:**

*Disposal must be made according to official regulations.*

*Packaging which is uncleaned or soiled with product remains is to be treated like the product itself*

*Packaging free of product remains is to be supplied refuse for recycling. Only if no adequate collecting system is available, they may be disposed of through the domestic rubbish*

**Recommended cleansing agents:** Water, if necessary together with cleansing agents.

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✻

· <i>Class</i>	
· <i>Label</i>	8
· <i>14.4 Packing group</i> · <i>ADR, IMDG, IATA</i>	<i>II</i>
· <i>14.5 Environmental hazards:</i> · <i>Marine pollutant:</i>	<i>No</i>
· <i>14.6 Special precautions for user</i> · <i>Hazard identification number (Kemler code):</i> · <i>EMS Number:</i> · <i>Segregation groups</i> · <i>Stowage Category</i>	<i>Warning: Corrosive substances.</i> <i>80</i> <i>F-A,S-B</i> <i>(SGG1) Acids</i> <i>B</i>

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· <b>Stowage Code</b>	SW2 Clear of living quarters.
· <b>14.7 Maritime transport in bulk according to IMO instruments</b> Not applicable.	
· <b>Transport/Additional information:</b>	
· <b>ADR</b>	
· <b>Limited quantities (LQ)</b>	1L
· <b>Excepted quantities (EQ)</b>	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· <b>Transport category</b>	2
· <b>IMDG</b>	
· <b>Limited quantities (LQ)</b>	1L
· <b>Excepted quantities (EQ)</b>	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· <b>IATA</b>	
· <b>Remarks:</b>	24h emergency contact - (Dangerous goods emergency number)  +49 172 739 6970
· <b>UN "Model Regulation":</b>	UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID, RUTHENIUM TRICHLORIDE), 8, II

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Trade name: **Black ruthenium conc. RU 1M, 25 g Ru/l****SchwarZRutheniumkonz. RU 1M, 25 g Ru/l**

### SECTION 15: Regulatory information

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

COUNCIL DIRECTIVE 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC)

DIRECTIVE 2012/18/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC

· **GADSL - Global Automotive Declarable Substance List**

None of the ingredients is listed.

· **Directive 2012/18/EU**

· **Named dangerous substances - ANNEX I** None of the ingredients is listed.

· **National regulations:**

· **Waterhazard class:** .

· **Other regulations, limitations and prohibitive regulations -**

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

GB

(Contd. on page

11)

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## Safety data sheet

according to 1907/2006/EC, Article 31

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### SECTION 16: Other information

*This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.*

#### · Reasons for revise

*If necessary, this safety data sheet can be revised according to legal guidelines.*

*Our current version for your reference is available on our website [www.heimerle-meule.com](http://www.heimerle-meule.com)*

#### · Relevant phrases

*H290 May be corrosive to metals.*

*H302 Harmful if swallowed.*

*H312 Harmful in contact with skin.*

*H314 Causes severe skin burns and eye damage.*

*H315 Causes skin irritation.*

*H319 Causes serious eye irritation.*

*H412 Harmful to aquatic life with long lasting effects.*

#### · Department issuing SDS:

*Abteilung BASU - Bau/Arbeitssicherheit/Umwelt*

*Department BASU - Construction / Occupational Safety / Environment*

*[sds@heimerle-meule.com](mailto:sds@heimerle-meule.com)*

#### · Contact:

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#### · Abbreviations and acronyms:

*RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)*

*IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA) ICAO:*

*International Civil Aviation Organisation*

*ICAO-TI: Technical Instructions by the "International Civil Aviation Organisation" (ICAO)*

*AwSV: Ordinance on facilities for handling water-polluting substances (German regulation). TRGS:*

*Technical rules for hazardous substances (German regulation)*

*ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)*

*IMDG: International Maritime Code for Dangerous Goods*

*IATA: International Air Transport Association*

*GHS: Globally Harmonised System of Classification and Labelling of Chemicals*

*EINECS: European Inventory of Existing Commercial Chemical Substances ELINCS:*

*European List of Notified Chemical Substances*

*CAS: Chemical Abstracts Service (division of the American Chemical Society)*

*LC50: Lethal concentration, 50 percent*

*LD50: Lethal dose, 50 percent*

*PBT: Persistent, Bioaccumulative and Toxic vPvB:*

*very Persistent and very Bioaccumulative*

*Met. Corr.1: Corrosive to metals – Category 1*

*Acute Tox. 4: Acute toxicity – Category 4*

*Skin Corr. 1A: Skin corrosion/irritation – Category 1A*

*Skin Corr. 1B: Skin corrosion/irritation – Category 1B*

*Skin Irrit. 2: Skin corrosion/irritation – Category 2*

*Eye Dam. 1: Serious eye damage/eye irritation – Category 1*

*Eye Irrit. 2: Serious eye damage/eye irritation – Category 2*

*Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3*

#### \* Data compared to the previous version altered.