

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



2-Phosphonobutane-1,2,4-tricarboxylic acid $\geq 47\%$

article number: **0854**
Version: **2.0 en**
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Version: (1)

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

1.1 Product identifier

Identification of the substance **2-Phosphonobutane-1,2,4-tricarboxylic acid $\geq 47\%$**
Article number 0854

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

Relevant identified uses: Laboratory and analytical use
Laboratory chemical
Uses advised against: Do not use for products which come into contact with foodstuffs. Do not use for private purposes (household).

1.3 Details of the supplier of the safety data sheet

Carl Roth GmbH + Co KG
Schoemperlenstr. 3-5
D-76185 Karlsruhe
Germany

Telephone: +49 (0) 721 - 56 06 0
Telefax: +49 (0) 721 - 56 06 149
e-mail: sicherheit@carlroth.de
Website: www.carlroth.de

Competent person responsible for the safety data sheet: Department Health, Safety and Environment

e-mail (competent person): sicherheit@carlroth.de

1.4 Emergency telephone number

| Name | Street | Postal code/city | Telephone | Website |
|---|-----------|----------------------|--------------|---------|
| National Poisons Information Service City Hospital | Dudley Rd | B187QH Birmingham | 844 892 0111 | |

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification acc. to GHS

| Section | Hazard class | Cat-egory | Hazard class and category | Hazard statement |
|---------|--|-----------|---------------------------|------------------|
| 2.16 | Substance or mixture corrosive to metals | 1 | Met. Corr. 1 | H290 |
| 3.3 | Serious eye damage/eye irritation | 2 | Eye Irrit. 2 | H319 |

For full text of abbreviations: see SECTION 16

2.2 Label elements

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Labelling

Signal word

Warning

Pictograms

GHS05



Hazard statements

H290 May be corrosive to metals
H319 Causes serious eye irritation

Precautionary statements

Precautionary statements - prevention

P234 Keep only in original packaging
P280 Wear protective gloves/eye protection

Precautionary statements - response

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337+P313 If eye irritation persists: Get medical advice/attention
P390 Absorb spillage to prevent material damage

2.3 Other hazards

Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

SECTION 3: Composition/information on ingredients

3.1 Substances

not relevant (mixture)

3.2 Mixtures

Description of the mixture

| Name of substance | Identifier | Wt% | Classification acc. to GHS | Pictograms | Notes |
|--|--|-----------|--|------------|-------|
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | CAS No 37971-36-1 EC No 253-733-5 | ≥ 47 | Met. Corr. 1 / H290 Eye Irrit. 2 / H319 | | |

For full text of abbreviations: see SECTION 16

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SECTION 4: First aid measures

4.1 Description of first aid measures



General notes

Take off contaminated clothing.

Following inhalation

Provide fresh air. In all cases of doubt, or when symptoms persist, seek medical advice.

Following skin contact

Rinse skin with water/shower. In all cases of doubt, or when symptoms persist, seek medical advice.

Following eye contact

Irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart. In case of eye irritation consult an ophthalmologist.

Following ingestion

Rinse mouth. Call a doctor if you feel unwell.

4.2 Most important symptoms and effects, both acute and delayed

Irritation

4.3 Indication of any immediate medical attention and special treatment needed

none

SECTION 5: Firefighting measures

5.1 Extinguishing media



Suitable extinguishing media

co-ordinate firefighting measures to the fire surroundings
water spray, alcohol resistant foam, dry extinguishing powder, BC-powder, carbon dioxide (CO₂)

Unsuitable extinguishing media

water jet

5.2 Special hazards arising from the substance or mixture

Combustible.

Hazardous combustion products

Carbon monoxide (CO), Carbon dioxide (CO₂), May produce toxic fumes of carbon monoxide if burning.

5.3 Advice for firefighters

In case of fire and/or explosion do not breathe fumes. Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures



For non-emergency personnel

Avoid contact with skin, eyes and clothes. Do not breathe vapour/spray.

6.2 Environmental precautions

Keep away from drains, surface and ground water. The product is an acid. Before discharge into sewage plants the product normally needs to be neutralised.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill

Covering of drains.

Advice on how to clean up a spill

Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents).

Other information relating to spills and releases

Place in appropriate containers for disposal. Ventilate affected area.

6.4 Reference to other sections

Hazardous combustion products: see section 5. Personal protective equipment: see section 8. Incompatible materials: see section 10. Disposal considerations: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provision of sufficient ventilation.

Advice on general occupational hygiene

Wash hands before breaks and after work. Keep away from food, drink and animal feedingstuffs.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed.

Incompatible substances or mixtures

Observe hints for combined storage.

Consideration of other advice:

Specific designs for storage rooms or vessels

Recommended storage temperature: 15 - 25 °C

7.3 Specific end use(s)

No information available.

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

This information is not available.

| Relevant DNELs of components of the mixture | | | | | | |
|---|------------|-----------|-----------------------|------------------------------------|-------------------|----------------------------|
| Name of substance | CAS No | End-point | Threshold level | Protection goal, route of exposure | Used in | Exposure time |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | DNEL | 15 mg/m ³ | human, inhalatory | worker (industry) | chronic - systemic effects |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | DNEL | 158 mg/m ³ | human, inhalatory | worker (industry) | acute - systemic effects |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | DNEL | 4,2 mg/kg bw/day | human, dermal | worker (industry) | chronic - systemic effects |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | DNEL | 80 mg/kg bw/day | human, dermal | worker (industry) | acute - systemic effects |

| Relevant PNECs of components of the mixture | | | | | | |
|---|------------|-----------|-----------------|-----------------------|------------------------------|------------------------------|
| Name of substance | CAS No | End-point | Threshold level | Organism | Environmental compartment | Exposure time |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | PNEC | 3,33 mg/l | aquatic organisms | freshwater | short-term (single instance) |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | PNEC | 0,33 mg/l | aquatic organisms | marine water | short-term (single instance) |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | PNEC | 50,4 mg/l | aquatic organisms | sewage treatment plant (STP) | short-term (single instance) |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | PNEC | 1,47 mg/kg | aquatic organisms | freshwater sediment | short-term (single instance) |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | PNEC | 0,491 mg/kg | terrestrial organisms | soil | short-term (single instance) |

8.2 Exposure controls

Individual protection measures (personal protective equipment)

Eye/face protection



Use safety goggles with side protection.

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Skin protection



• hand protection

Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves. The times are approximate values from measurements at 22 °C and permanent contact. Increased temperatures due to heated substances, body heat etc. and a reduction of the effective layer thickness by stretching can lead to a considerable reduction of the breakthrough time. If in doubt, contact manufacturer. At an approx. 1.5 times larger / smaller layer thickness, the respective breakthrough time is doubled / halved. The data apply only to the pure substance. When transferred to substance mixtures, they may only be considered as a guide.

• type of material

NBR (Nitrile rubber)

• material thickness

>0,11 mm

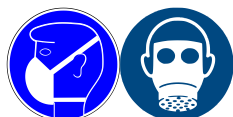
• breakthrough times of the glove material

>480 minutes (permeation: level 6)

• other protection measures

Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

Respiratory protection



Respiratory protection necessary at: Aerosol or mist formation. Type: A (against organic gases and vapours with a boiling point of > 65 °C, colour code: Brown). Usually no personal respiratory protection necessary.

Environmental exposure controls

Keep away from drains, surface and ground water.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|--|---|
| Physical state | liquid |
| Colour | colourless - light yellow |
| Odour | characteristic |
| Melting point/freezing point | not determined |
| Boiling point or initial boiling point and boiling range | ~100 °C |
| Flammability | this material is combustible, but will not ignite readily |
| Lower and upper explosion limit | not determined |

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| | |
|--|---|
| Flash point | >100 °C |
| Auto-ignition temperature | not determined |
| Decomposition temperature | not relevant |
| pH (value) | ~2 (20 °C) |
| Kinematic viscosity | not determined |
| <u>Solubility(ies)</u> | |
| Water solubility | miscible in any proportion |
| <u>Partition coefficient</u> | |
| Partition coefficient n-octanol/water (log value): | this information is not available |
| Vapour pressure | 23 hPa at 20 °C |
| <u>Density and/or relative density</u> | |
| Density | 1,27 g/cm ³ at 20 °C |
| Relative vapour density | information on this property is not available |
| Particle characteristics | not relevant (liquid) |
| <u>Other safety parameters</u> | |
| Oxidising properties | none |

9.2 Other information

Information with regard to physical hazard classes:

| | |
|-------------------------------|---------------------------------|
| Corrosive to metals | category 1: corrosive to metals |
| Other safety characteristics: | |
| Miscibility | completely miscible with water |

SECTION 10: Stability and reactivity

10.1 Reactivity

Substance or mixture corrosive to metals.

If heated

Vapours may form explosive mixtures with air.

10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

10.3 Possibility of hazardous reactions

Violent reaction with: strong oxidiser, Strong alkali

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10.4 Conditions to avoid

There are no specific conditions known which have to be avoided.

10.5 Incompatible materials

different metals

10.6 Hazardous decomposition products

Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Test data are not available for the complete mixture.

Classification procedure

The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

Classification acc. to GHS

Acute toxicity

Shall not be classified as acutely toxic.

| Acute toxicity of components of the mixture | | | | | |
|---|------------|----------------|----------|------------------------|---------|
| Name of substance | CAS No | Exposure route | Endpoint | Value | Species |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | oral | LD50 | $>6.500 \text{ mg/kg}$ | rat |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | dermal | LD50 | $>4.000 \text{ mg/kg}$ | rat |

Skin corrosion/irritation

Shall not be classified as corrosive/irritant to skin.

Serious eye damage/eye irritation

Causes serious eye irritation.

Respiratory or skin sensitisation

Shall not be classified as a respiratory or skin sensitiser.

Germ cell mutagenicity

Shall not be classified as germ cell mutagenic.

Carcinogenicity

Shall not be classified as carcinogenic.

Reproductive toxicity

Shall not be classified as a reproductive toxicant.

Specific target organ toxicity - single exposure

Shall not be classified as a specific target organ toxicant (single exposure).

Specific target organ toxicity - repeated exposure

Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

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Symptoms related to the physical, chemical and toxicological characteristics

- **If swallowed**

Data are not available.

- **If in eyes**

Causes serious eye irritation

- **If inhaled**

Data are not available.

- **If on skin**

Frequently or prolonged contact with skin may cause dermal irritation

- **Other information**

none

11.2 Endocrine disrupting properties

None of the ingredients are listed.

11.3 Information on other hazards

There is no additional information.

SECTION 12: Ecological information

12.1 Toxicity

Shall not be classified as hazardous to the aquatic environment.

| Aquatic toxicity (acute) of components of the mixture | | | | | |
|---|------------|----------|-------------|---------------|---------------|
| Name of substance | CAS No | Endpoint | Value | Species | Exposure time |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | LC50 | >1.042 mg/l | striped brill | 96 h |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | EC50 | >1.071 mg/l | daphnia magna | 48 h |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | ErC50 | >1.081 mg/l | algae | 72 h |

| Aquatic toxicity (chronic) of components of the mixture | | | | | |
|---|------------|----------|-------------|---------------|---------------|
| Name of substance | CAS No | Endpoint | Value | Species | Exposure time |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | EC50 | >1.071 mg/l | daphnia magna | 21 d |

Biodegradation

Data are not available.

12.2 Process of degradability

Data are not available.

12.3 Bioaccumulative potential

Data are not available.

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Bioaccumulative potential of components of the mixture

| Name of substance | CAS No | BCF | Log KOW | BOD5/COD |
|--|------------|-----|---------------|----------|
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | 37971-36-1 | | -1,36 (25 °C) | |

12.4 Mobility in soil

Data are not available.

12.5 Results of PBT and vPvB assessment

Data are not available.

12.6 Endocrine disrupting properties

None of the ingredients are listed.

12.7 Other adverse effects

Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods



This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information

Do not empty into drains.

Waste treatment of containers/packagings

It is a dangerous waste; only packagings which are approved (e.g. acc. to ADR) may be used.

13.2 Relevant provisions relating to waste

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process. Waste catalogue ordinance (Germany).

13.3 Remarks

Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1 UN number or ID number

| | |
|-----------|---------|
| ADRRID | UN 3265 |
| IMDG-Code | UN 3265 |
| ICAO-TI | UN 3265 |

14.2 UN proper shipping name

| | |
|-----------|---|
| ADRRID | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| IMDG-Code | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| ICAO-TI | Corrosive liquid, acidic, organic, n.o.s. |



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| | |
|--|--|
| Technical name (hazardous ingredients) | 2-Phosphonobutane-1,2,4-tricarboxylic acid |
| 14.3 Transport hazard class(es) | |
| ADRRID | 8 |
| IMDG-Code | 8 |
| ICAO-TI | 8 |
| 14.4 Packing group | |
| ADRRID | III |
| IMDG-Code | III |
| ICAO-TI | III |
| 14.5 Environmental hazards | non-environmentally hazardous acc. to the dangerous goods regulations |
| 14.6 Special precautions for user | |
| Provisions for dangerous goods (ADR) should be complied within the premises. | |
| 14.7 Maritime transport in bulk according to IMO instruments | |
| The cargo is not intended to be carried in bulk. | |
| 14.8 Information for each of the UN Model Regulations | |
| Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN) - Additional information | |
| Proper shipping name | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| Particulars in the transport document | UN3265, CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S., (contains: 2-Phosphonobutane-1,2,4-tricarboxylic acid), 8, III, (E) |
| Classification code | C3 |
| Danger label(s) | 8 |
|  | |
| Special provisions (SP) | 274 |
| Excepted quantities (EQ) | E1 |
| Limited quantities (LQ) | 5 L |
| Transport category (TC) | 3 |
| Tunnel restriction code (TRC) | E |
| Hazard identification No | 80 |
| Emergency Action Code | 2X |
| Regulations concerning the International Carriage of Dangerous Goods by Rail (RID) Additional information | |
| Classification code | 8 |
| Danger label(s) | 8 |
|  | |

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| | |
|---------------------------------|-----|
| Special provisions (SP) | 274 |
| Excepted quantities (EQ) | E1 |
| Limited quantities (LQ) | 5 L |
| Transport category (TC) | 3 |
| Hazard identification No | 80 |

International Maritime Dangerous Goods Code (IMDG) - Additional information

| | |
|--|---|
| Proper shipping name | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| Particulars in the shipper's declaration | UN3265, CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S., (contains: 2-Phosphonobutane-1,2,4-tricarboxylic acid), 8, III |
| Marine pollutant | - |
| Danger label(s) | 8 |



| | |
|--------------------------|-----------|
| Special provisions (SP) | 223, 274 |
| Excepted quantities (EQ) | E1 |
| Limited quantities (LQ) | 5 L |
| EmS | F-A, S-B |
| Stowage category | A |
| Segregation group | 1 - Acids |

International Civil Aviation Organization (ICAO-IATA/DGR) - Additional information

| | |
|--|---|
| Proper shipping name | Corrosive liquid, acidic, organic, n.o.s. |
| Particulars in the shipper's declaration | UN3265, Corrosive liquid, acidic, organic, n.o.s., (contains: 2-Phosphonobutane-1,2,4-tricarboxylic acid), 8, III |
| Danger label(s) | 8 |



| | |
|--------------------------|-----|
| Special provisions (SP) | A3 |
| Excepted quantities (EQ) | E1 |
| Limited quantities (LQ) | 1 L |

SECTION 15: Regulatory information

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

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Relevant provisions of the European Union (EU)

Seveso Directive

| 2012/18/EU (Seveso III) | | | |
|-------------------------|---------------------------------------|---|-------|
| No | Dangerous substance/hazard categories | Qualifying quantity (tonnes) for the application of lower and upper-tier requirements | Notes |
| | not assigned | | |

Deco-Paint Directive

| | |
|-------------|--------------|
| VOC content | 0 % 0 g/l |
|-------------|--------------|

Industrial Emissions Directive (IED)

| | |
|--|-------|
| VOC content | 0 % |
| VOC content (Water content was discounted) | 0 g/l |

Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

none of the ingredients are listed

Regulation concerning the establishment of a European Pollutant Release and Transfer Register (PRTR)

none of the ingredients are listed

Water Framework Directive (WFD)

| List of pollutants (WFD) | | | | |
|--|-----------------------------|--------|-----------|---------|
| Name of substance | Name acc. to inventory | CAS No | Listed in | Remarks |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | Organophosphorous compounds | | a) | |

Legend

A) Indicative list of the main pollutants

Regulation on the marketing and use of explosives precursors

none of the ingredients are listed

Regulation on drug precursors

none of the ingredients are listed

Regulation on substances that deplete the ozone layer (ODS)

none of the ingredients are listed

Regulation concerning the export and import of hazardous chemicals (PIC)

none of the ingredients are listed

Regulation on persistent organic pollutants (POP)

none of the ingredients are listed

National regulations(GB)

List of substances subject to authorisation (GB REACH, Annex 14) / SVHC - candidate list

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none of the ingredients are listed

Restrictions according to GB REACH, Annex 17

none of the ingredients are listed

| Dangerous substances with restrictions (GB REACH, Annex 17) | | | |
|---|--|--------|----|
| Name of substance | Name acc. to inventory | CAS No | No |
| 2-Phosphonobutane-1,2,4-tricarboxylic acid | this product meets the criteria for classification in accordance with Regulation No 1272/2008/EC | | 3 |

Other information

Directive 94/33/EC on the protection of young people at work. Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.

National inventories

| Country | Inventory | Status |
|---------|------------|--------------------------------|
| AU | AIIC | all ingredients are listed |
| CA | DSL | all ingredients are listed |
| CN | IECSC | all ingredients are listed |
| EU | ECSI | all ingredients are listed |
| EU | REACH Reg. | all ingredients are listed |
| JP | CSCL-ENCS | all ingredients are listed |
| KR | KECI | all ingredients are listed |
| MX | INSQ | all ingredients are listed |
| NZ | NZIoC | all ingredients are listed |
| PH | PICCS | all ingredients are listed |
| TR | CICR | not all ingredients are listed |
| TW | TCSI | all ingredients are listed |
| US | TSCA | all ingredients are listed |

Legend

| | |
|------------|---|
| AIIC | Australian Inventory of Industrial Chemicals |
| CICR | Chemical Inventory and Control Regulation |
| CSCL-ENCS | List of Existing and New Chemical Substances (CSCL-ENCS) |
| DSL | Domestic Substances List (DSL) |
| ECSI | EC Substance Inventory (EINECS, ELINCS, NLP) |
| IECSC | Inventory of Existing Chemical Substances Produced or Imported in China |
| INSQ | National Inventory of Chemical Substances |
| KECI | Korea Existing Chemicals Inventory |
| NZIoC | New Zealand Inventory of Chemicals |
| PICCS | Philippine Inventory of Chemicals and Chemical Substances (PICCS) |
| REACH Reg. | REACH registered substances |
| TCSI | Taiwan Chemical Substance Inventory |
| TSCA | Toxic Substance Control Act |

15.2 Chemical Safety Assessment

Chemical safety assessments for substances in this mixture were not carried out.

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SECTION 16: Other information

Indication of changes (revised safety data sheet)

Alignment to regulation:

Restructuring: section 9, section 14

| Section | Former entry (text/value) | Actual entry (text/value) | Safety-relevant |
|---------|--|--|-----------------|
| 2.1 | | Classification acc. to GHS: change in the listing (table) | yes |
| 2.2 | Labelling of packages where the contents do not exceed 125 ml: Signal word: Warning | | yes |
| 2.2 | | Labelling of packages where the contents do not exceed 125 ml: change in the listing (table) | yes |
| 2.2 | | Labelling of packages where the contents do not exceed 125 ml: change in the listing (table) | yes |
| 2.3 | Other hazards: There is no additional information. | Other hazards | yes |
| 2.3 | | Results of PBT and vPvB assessment: This mixture does not contain any substances that are assessed to be a PBT or a vPvB. | yes |

Abbreviations and acronyms

| Abbr. | Descriptions of used abbreviations |
|--------|---|
| ADN | Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways) |
| ADR | Accord relatif au transport international des marchandises dangereuses par route (Agreement concerning the International Carriage of Dangerous Goods by Road) |
| BCF | Bioconcentration factor |
| BOD | Biochemical Oxygen Demand |
| CAS | Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances) |
| COD | Chemical oxygen demand |
| DGR | Dangerous Goods Regulations (see IATA/DGR) |
| DNEL | Derived No-Effect Level |
| EC50 | Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval |
| EC No | The EC Inventory (EINECS, ELINCS and the NLP-list) is the source for the seven-digit EC number, an identifier of substances commercially available within the EU (European Union) |
| EINECS | European Inventory of Existing Commercial Chemical Substances |
| ELINCS | European List of Notified Chemical Substances |
| EmS | Emergency Schedule |
| ErC50 | ≡ EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control |

Safety data sheet

acc. to Regulation (EC) No. 1907/2006 (REACH)



2-Phosphonobutane-1,2,4-tricarboxylic acid $\geq 47\%$

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| Abbr. | Descriptions of used abbreviations |
|------------|---|
| Eye Dam. | Seriously damaging to the eye |
| Eye Irrit. | Irritant to the eye |
| GB REACH | The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019, SI 2019/758 (as amended) |
| GHS | "Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations |
| IATA | International Air Transport Association |
| IATA/DGR | Dangerous Goods Regulations (DGR) for the air transport (IATA) |
| ICAO | International Civil Aviation Organization |
| ICAO-TI | Technical instructions for the safe transport of dangerous goods by air |
| IMDG | International Maritime Dangerous Goods Code |
| IMDG-Code | International Maritime Dangerous Goods Code |
| LC50 | Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval |
| LD50 | Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval |
| log KOW | n-Octanol/water |
| Met. Corr. | Substance or mixture corrosive to metals |
| NLP | No-Longer Polymer |
| PBT | Persistent, Bioaccumulative and Toxic |
| PNEC | Predicted No-Effect Concentration |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals |
| RID | Règlement concernant le transport International ferroviaire des marchandises Dangereuses (Regulations concerning the International carriage of Dangerous goods by Rail) |
| VOC | Volatile Organic Compounds |
| vPvB | Very Persistent and very Bioaccumulative |

Key literature references and sources for data

Agreement concerning the International Carriage of Dangerous Goods by Road (ADR). Regulations concerning the International Carriage of Dangerous Goods by Rail (RID). International Maritime Dangerous Goods Code (IMDG). Dangerous Goods Regulations (DGR) for the air transport (IATA).

Classification procedure

Physical and chemical properties. The classification is based on tested mixture. Health hazards. Environmental hazards. The method for classification of the mixture is based on ingredients of the mixture (additivity formula).

List of relevant phrases (code and full text as stated in section 2 and 3)

| Code | Text |
|------|--------------------------------|
| H290 | May be corrosive to metals. |
| H319 | Causes serious eye irritation. |

Safety data sheet

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2-Phosphonobutane-1,2,4-tricarboxylic acid ≥ 47 %

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Disclaimer

This information is based upon the present state of our knowledge. This SDS has been compiled and is solely intended for this product.