

## Boric acid



[Identification](#) | [Characterisation](#) | [Formula](#) | [Physical and chemical properties](#) | [Toxicology / Ecotoxicology](#) | [Occupational health and first aid](#) | [Safe handling](#) | [Regulations](#) | [Links](#) | [Literature register](#)

### IDENTIFICATION

**Boric acid**  
Orthoboric acid

**ZVG No:** 3640  
**CAS No:** 10043-35-3  
**EC No:** 233-139-2  
**INDEX No:** 005-007-00-2

**Related**

<b>CAS No:</b>	11113-50-1	boric acid, raw, native
<b>EC No:</b>	234-343-4	

### CHARACTERISATION

#### SUBSTANCE GROUP CODE

120510 Acids, inorganic  
124100 Boron compounds

#### STATE OF AGGREGATION

The substance is solid.

#### PROPERTIES

crystalline powder  
white  
odourless

#### CHEMICAL CHARACTERISATION

Non-combustible substance.  
Soluble in water.  
Aqueous solution reacts acidic.  
Chemically unstable at increased temperature.  
Acute or chronic health hazards result from the substance.  
(see: chapter REGULATIONS).

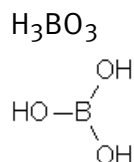
[Substance information in Wikipedia](#)

## DUST EXPLOSIVENESS

No risk of dust explosion.

Quelle: [99999](#)

## FORMULA



**Molar mass:** 61,83 g/mol

## PHYSICAL AND CHEMICAL PROPERTIES

[Melting point](#) | [Density](#) | [Solubility](#) | [pH-value](#) | [Hazardous reactions](#)

### MELTING POINT

Melting point: 168 ... 171 °C

When rapidly heated in a closed system.

The substance decomposes when heated (see decomposition temperature).

Reference: [00220](#)

### DENSITY

DENSITY

Value: 1,48 g/cm<sup>3</sup>

Temperature: 23 °C

Reference: [01221](#)

### SOLUBILITY IN WATER

Concentration: 49,2 g/l

Temperature: 20 °C

Reference: [01221](#)

### pH-VALUE

pH-value: 3,8 ... 4,8

Temperature: 20 °C

Concentration: 33 g/l

Reference: [01231](#)

### HAZARDOUS REACTIONS

**Decomposition temperature:** ca. 100 ... 130 °C

Formation of metaboric acid by loss of water.  
At 160 deg C a glassy melt of boron trioxide is formed  
by further loss of water.

### Hazardous chemical reactions

Risk of explosion in contact with:  
acetic anhydride (heat)

## TOXICOLOGY / ECOTOXICOLOGY

### TOXICOLOGICAL DATA

#### LD50 oral rat

Value: 2660 mg/kg

JAMA, Journal of the American Medical Association. Vol. 128, Pg. 266, 1945.

Reference: [02071](#)

### ECOTOXICOLOGICAL DATA

#### LC50 Fish (96 hours)

Minimum: 79 mg/l

Maximum: 5600 mg/l

Median: 487 mg/l

Study number: 14

Reference for median:

Hamilton, S.J., and K.J. Buhl 1990. Acute Toxicity of Boron, Molybdenum, and Selenium to Fry of Chinook Salmon and Coho Salmon. Arch.Environ.Contam.Toxicol. 19(3):366-373; Hamilton, S.J. 1995. Hazard Assessment of Inorganics to Three Endangered Fish in the Green River, Utah. Ecotoxicol.Environ.Saf. 30(2):134-142

#### LC50 Crustaceans (48 hours)

Minimum: 133 mg/l

Maximum: 226 mg/l

Median: 180 mg/l

Study number: 2

Reference for median:

Gersich, F.M. 1984. Evaluation of a Static Renewal Chronic Toxicity Test Method for Daphnia magna Straus Using Boric Acid. Environ.Toxicol.Chem. 3(1):89-94; Lewis, M.A., and L.C. Valentine 1981. Acute and Chronic Toxicities of Boric Acid to Daphnia magna Straus. Bull.Environ.Contam.Toxicol. 27(3):309-315

#### EC50 Crustaceans (48 hours)

Minimum: 133 mg/l

Maximum: 777 mg/l

Median: 226 mg/l

Study number: 3

Reference for median:

Office of Pesticide Programs 2000. Pesticide Ecotoxicity Database (Formerly: Environmental Effects Database (EEDB)). Environmental Fate and Effects Division, U.S.EPA, Washington, D.C.

Reference: [02072](#)

**LC50 Crustaceans (48 hours)**

Minimum: 84,3 mg/l

Maximum: 138 mg/l

Median: 91 mg/l

Study number: 4

Reference for median:

Marcussen, C.E., and J.J. Yurk 1990. Boron: Acute Toxicity to Mysids (*Mysidopsis bahia*) Under Flow-Through Conditions. Lab.Proj.ID No.3903004000-0215-3140, ESE, Gainesville, FL :44 p.

Reference: 02072

**OCCUPATIONAL HEALTH AND FIRST AID**

[Routes of exposure](#) | [Toxic effects](#) |  
[First Aid](#)

**ROUTES OF EXPOSURE****Main routes of exposure**

Under occupational conditions, the main intake pathway for boric acid (B.) proceeds via the respiratory tract.[00083]

Furthermore, the uptake of the solid or its concentrated solutions should be expected following contact with damaged or inflamed skin.[00454]

Outside the occupational area the intake of minor amounts proceeds via the gastrointestinal tract (food, drinking water).[00083]

**Respiratory tract**

Exposure is mainly possible to dusts (or aerosols from solutions).

Following inhalation B. is absorbed into the blood to a high extent. However, no kinetic studies are available on how much is directly absorbed via the airways and how much in the gastrointestinal tract via the mucociliary clearance of the lung.[00083]

**Skin**

The very low dermal intake of B. was demonstrated in kinetic in-vitro and in-vivo studies on the human skin.

A 5 % solution of 10B-enriched B. was applied on a dorsal skin area of volunteers. Subsequently, the water was evaporated by means of an airstream. After covering the area with a T-shirt for 24 hours the skin was cleansed. The material balance of the dermal uptake was carried out by quantification of borate in the urine and in the wash solutions from the decontamination of the skin and the T-shirts. The following data were found under these circumstances: absorption rate: 0.226 %, steady state flow: 0.009 µg/cm<sup>2</sup>/h, coefficient of permeability: 1.9 x 10 exp.-7 cm/h.

From the results it was even concluded that safety gloves are unnecessary for the handling of B. However, it was conceded that through extensive, long-term contact with saturated B. solutions somewhat larger amounts can be absorbed.[99997]

From various cases of poisoning the knowledge resulted that B. is significantly better absorbable via the non-intact skin.[99983]

**Gastrointestinal tract**

Kinetic studies on volunteers and animals resulted in nearly complete absorption of B. via the gastrointestinal tract.

An average absorption half life of 0.6 hours was determined.[99997]

**TOXIC EFFECTS****Main toxic effects**

**Acute:**

Slightly irritating to the eyes and skin;[07934]

gastrointestinal disturbances, CNS-effects and (later) skin damage after massive poisoning[07650]

**Chronic:**

Irritation to the mucous membranes following inhalative exposure;[07619]

effects to the gastrointestinal tract and CNS[07650]

**Acute toxicity**

100 mg B. caused discoloration and blistering to rabbits' eyes after impact for 24 hours. These effects were shown to be reversible within 7 days.[07934]

An irritating effect of the solid matter is also assumed for humans. On the other hand, diluted solutions are non-irritating and can as ever be used in minor amounts as a bacteriostatic therapeutic agent (contrary to B. containing dermatics which are regarded as contraindicated). Skin contact, even with saturated solutions, did not lead to irritation though the evaporated solution remained on the dorsal skin of volunteers for 24 hours.[99997]

However, following occlusive application to rabbits and guinea pigs slight up to moderate irritation was demonstrated after 24 hours. In a Buehler-test on guinea pigs (according to OECD guideline 406) no sensitizing potential was detectable.[07934]

Also from experience for many years on humans (formerly therapeutical application) a sensitizing potential is not derivable.[07866]

No absorptive-toxic effects are expected after contact with the intact skin.[99983]

However, massive impact to the damaged skin, in particular for children, has caused poisoning and even death. Symptoms: increase of the body temperature, respiratory depression, diarrhoea cramps. [00438]

Certainly, from the reports it is not clearly apparent whether or not it concerned a single application. [99999]

No information is available regarding irritation to the airways of humans through acute inhalative intake.[99983]

On rats, relatively high concentrations (160 mg/m<sup>3</sup> for 4 h) only caused slight irritation to the mucous membranes. In a limit test (according to OECD-guideline 403), 2000 mg/m<sup>3</sup> caused lacrimation and running nose which still persisted for days after termination of exposure. The animals were hypoactive and took up a crouched position.[07934]

In spite of a multitude of reported oral poisoning cases with B., valid data regarding LD values for humans cannot be stated. Clinical symptoms of poisoning were vomiting, diarrhoea, cramps, CNS-depression, skin damage appearing after a delay, function disturbances of the kidneys through to degenerative damage to the tubular cells. Dependent on the concentration, they are expected in the broad dose level of 100 mg up to 55.5 g.

Certainly, the low doses seem to be more relevant for children.[00083]

**Chronic toxicity**

For the occupational area no information on the consequences of repeated exposure to B. only is available.[99983]

Even prolonged oral and dermal application of B. as a therapeutic agent has apparently caused significant damage only in particular cases.[00083]

A 14 year old patient with burns to the skin died following dermal application of a compress (2 - 3 times per day) containing 1 % B. solution for 5 weeks.[07647]

Following chronic exposure, observed in particular on babies, skin damage can appear independent of the mode of application. Furthermore, damage to the kidneys (oliguria, anuresis, necrosis to the tubular cells) and changes to the body temperature (hypothermia or hyperthermia) were reported.

Chronic poisoning due to repeated oral intake can occur for adults through doses of 4 - 5 g B./d within 3 - 4 weeks. This corresponds to an intake of about 2.12 g boron/d.[08011]

From a 2 years-feeding study on rats a LOAEL of 58 and a NOAEL of 17.5 mg boron/kg bw/d (related to changes to the weight of the testes, brain and thyroid gland) was derived for B.[07650]

No valid animal experimental studies on repeated dermal or inhalative exposure are available. [99983]

Former inhalation studies on rats exposed to 470 or 77 mg/m<sup>3</sup> of boron oxide dust (anhydride of boric acid) for 10 or 24 weeks (6 h/d, 5 d/w) did not result in clinical poisoning symptoms or histologically detectable changes to the organs.

Only the status of the urine (enlarged volume, increased excretion of creatinine and borate) was changed.[00083]

**Reproductive toxicity, mutagenicity, carcinogenicity**

#### Reproductive toxicity:

Numerous studies on various animal species were carried out with boric acid and borates. From this it was derived that the reproductive toxicity seems to be the critical effect.

19.2 mg boron/d was calculated as the tolerable daily intake for humans in order to avoid developmental disturbances.[07650]

Another calculation with 0.4 mg/kg bw/d led to a similar result.[00083]

Besides the developmental disturbances (the most sensitive parameter), mainly damage to the testes and fertility disturbances were observed in the animal experiments.[99997]

#### Mutagenicity:

A long list of microbiological studies and tests on cellular preparations as well as one in-vivo test carried out to date. B. did not show genotoxic effects.[07934]

#### Carcinogenicity:

One 2-year feeding study on rats and mice carried out to date did not provide any indication of a carcinogenic potential for B.[00083]

### Biotransformation and excretion

Once absorbed B. is not metabolized but is nearly quantitatively excreted via the kidneys, to a smaller part also with the feces, sweat and saliva.

The elimination half life for humans was calculated to be about 21 hours.[99997]

From the retrospective analysis of numerous cases of oral poisoning an even shorter half life of on average 13.4 h resulted.[00083]

For that reason, the tendency of B. to accumulate in the organism which was reported in several secondary literature sources, should be less pronounced.[99999]

According to recent knowledge, only the kinetics of a certain accumulation or mobilization in the bones following long-term (massive) exposure still needs to be examined.[00083]

### Annotation

This occupational health information was compiled on 04.03.2002.

It will be updated if necessary.

## FIRST AID

### Eyes

Rinse the affected eye with widely spread lids for 10 minutes under running water whilst protecting the unimpaired eye.

Arrange medical treatment.

[99997]

### Skin

Remove contaminated clothing while protecting yourself.

Rinse the affected skin areas for at least 10 to 20 minutes under running water.

Do not try to neutralize! For skin irritation and in every case after contact with damaged skin:

Arrange for medical treatment.

[99997]

### Respiratory tract

Whilst protecting yourself remove the casualty from the hazardous area and take him to the fresh air.

Lay the casualty down in a quiet place and protect him against hypothermia.

In the case of breathing difficulties have the casualty inhale oxygen.

Arrange medical treatment.

[07750]

### Swallowing

Rinse the mouth and spit the fluids out.

If the casualty is conscious have him drink 1 glass of water (ca 200 ml).

Do not make the casualty vomit.

Arrange medical treatment.

During spontaneous vomiting hold the head of the casualty low with the body in a prone position in order to avoid aspiration.

[07750, 99997, 99983, 07638, 99999]

### Information for physicians

In former times, boric acid was used as a therapeutic agent (slight bacteriostatic and fungistatic effect). It was applied dermally (as a powder or solution) and also orally. Because of systemic effects, in particular following contact with damaged skin and after ingestion, for a long time now it has been contraindicated for almost all medical applications.[00083] No information concerning to serious occupationally conditioned poisoning is available.

- Symptoms of acute poisoning:

Eyes: irritation only due to saturated solutions and solid matter[99983]

Skin: acute irritation to the intact skin hardly to be expected;[99997] skin damage (e.g. erythematous dermatitis), if boric acid conditioned, more likely as a delayed absorptive-toxic action; absorption with the following toxic effects after massive contact with non-intact skin possible, particularly for children[07647]

Inhalation: slight irritation to the mucous membranes only at relatively high concentrations, persistent lacrimation and rhinorrhoea as well as systemic effects only following very high concentrations (known only from animal experiments)

Ingestion: gastrointestinal disturbances (nausea, emesis, diarrhoea, epigastric pain), possibly rapid entry of systemic effects[07934]

Absorption: disturbances to the CNS (lethargy, convulsions, collapse, coma), skin lesions with later desquamation, possible alopecia, function disturbance up to damage to the kidneys (oliguresis, anuria, degeneration of the tubular cells);[07606] possible tachycardia and cyanosis.[07819]

- Medical advice:

Eyes contaminated with the solid matter should thoroughly rinsed yet again with water. If irritation persists, an ophthalmologist should be consulted immediately.[08011]

If dermatitis occurs, it indicates possible systemic effects and requires a detailed analysis of the exposure situation, as well as a symptomatic therapy.[99999]

If hypoxia occurs after massive inhalation of dusts/aerosols from solutions, immediate artificial ventilation with O<sub>2</sub>-enriched air (best via a bag-valve mask system) is required, until arrival in hospital. Open and maintain open the patient's airway; intubation, if necessary. Check of the parameters of the heart/circulatory system.[07638]

Following ingestion of doses < 6 g boric acid, for persons with > 30 kg bw first only observation was recommended. Higher doses require a gastrolavage as soon as possible. Casualties in coma or with cramps or absent retching reflex must be intubated. The gastrointestinal absorption is considered to be complete after 2 - 3 hours (possibly earlier still), also for doses > 12 g. After the gastrolavage charcoal can be applied, however, its effectiveness is not proven. A laxative (e.g. magnesium sulfate, 250 mg/kg bw) seems to be favorable in every case.[08011]

Therapy for shock, if necessary, for cramps diazepam (5 up to maximum 20 mg i.m. or up to 10 mg i.v.; possibly repeatedly) can be applied. Constant monitoring of the functions of the heart/circulatory system and kidneys is essential.[07637]

## Recommendations

Provide the physician information about the substance/product and treatment already administered.

In order to establish the seriousness of the poisoning and its progression it is recommended to determine the following parameters as soon as possible: borate in the serum and urine, electrolytes, acid-base balance, urea-nitrogen in the blood, creatinine in the serum, transaminases.

If the kidney function is intact, a forced diuresis with mannitol and furosemide for the acceleration of the elimination of borate can be carried out. Experience of the higher effectiveness of peritoneal dialysis or hemodialysis differs; apparently both of the procedures are suitable and indicated, if the concentration of borate in the serum is higher than 185 - 200 µg/ml.

No experience regarding an effective antidote is available.[99983]

According to the results obtained on rats, the application of N-acetylcysteine could be suitable for accelerating the elimination of borate and for removing an oliguresis conditioned by boric acid. [00454]

## Annotation

This first aid information was compiled on 04.03.2002.  
It will be updated if necessary.

## SAFE HANDLING

## TECHNICAL MEASURES - HANDLING

### Workplace

Provision of very good ventilation in the working area.

The cleaned air should not be returned to the working area. Air that has been pumped out can only be returned if it has been sufficiently cleaned using an acknowledged method.

Washing facility at the workplace required.

### Equipment

Use only closed apparatus.

If release of the substance cannot be prevented, then it should be suctioned off at the point of exit.

Consider emission limit values, a purification of waste gases if necessary.

Label containers and pipelines clearly.

### Advice on safer handling

Take care to maintain clean working place.

The substance must not be present at workplaces in quantities above that required for work to be progressed.

Do not leave container open.

Use leak-proof equipment with exhaust for refilling or transfer.

Avoid spillage.

Fill only into labelled container.

Avoid rising dust.

Use an appropriate exterior vessel when transporting in fragile containers.

### Cleaning and maintenance

Use protective equipment while cleaning if necessary.

Avoid dust formation. Dust formation that cannot be avoided must be collected regularly.

Use a tested industrial vacuum cleaner or suction device.

Do not raise dust while cleaning.

Use of a blower for cleaning is not permitted.

Alternative: clean damp.

Only conduct maintenance and other work on or in the vessel or closed spaces after obtaining written permission.

## TECHNICAL MEASURES - STORAGE

### Storage

Do not use any food containers - risk of mistake.

Containers have to be labelled clearly and permanently.

Store in the original container as much as possible.

Keep container tightly closed in a cool, dry and well-ventilated place.

Protect from moisture.

### Conditions of collocated storage

Storage class 6.1 D (Not combustible, acutely toxic Cat. 3 or chronic effecting substances)

Only substances of the same storage class should be stored together.

Collocated storage with the following substances is prohibited:

- Pharmaceuticals, foods, and animal feeds including additives.
- Infectious, radioactive und explosive substances.
- Gases.
- Other explosive substances of storage class 4.1A.
- Strongly oxidizing substances of storage class 5.1A.



- Ammonium nitrate and preparations containing ammonium nitrate.
- Organic peroxides and self reactive substances.

Under certain conditions the collocated storage with the following sub-stances is permitted (For more details see [TRGS 510](#)):

- Flammable liquids of storage class 3.
- Flammable solid substances or desensitized substances of storage class 4.1B.
- Pyrophoric substances.
- Substances liberating flammable gases in contact with water.
- Oxidizing substances of storage class 5.1B.

The substance should not be stored with substances with which hazardous chemical reactions are possible.

## TECHNICAL MEASURES - FIRE AND EXPLOSION PROTECTION

### Technical, constructive measures

Substance is non-combustible. Select fire and explosion prevention measures according to the other used substances.

## ORGANISATIONAL MEASURES

Instruction on the hazards and the protective measures using instruction manual ([TRGS 555](#)) are required with signature if just more than one minor hazard was detected.

Instruction must be provided before employment and then at a minimum of once per annum thereafter.

It must be assured that the workplace limit values are being maintained. If the limit values are exceeded, additional protection measures are necessary.

The measurements must be recorded and kept on file.

Observe the restrictions on juvenile employment as defined in the "Jugendarbeitsschutzgesetz".

Observe the restrictions on activities of pregnant women according to the the „Mutterschutzgesetz“ (German Maternity Protection Act)

## PERSONAL PROTECTION

### Body protection

Depending on the risk, wear a suitable protective clothing or a suitable chemical protection suit.

### Respiratory protection

In an emergency (e.g.: unintentional release of the substance, exceeding the occupational exposure limit value) respiratory protection must be worn. Consider the maximum period for wear.

Respiratory protection: Particle filter P3, colour code white.

Use insulating device for concentrations above the usage limits for filter devices, for oxygen concentrations below 17% volume, or in circumstances which are unclear.

### Eye protection

Sufficient eye protection should be worn.

Wear glasses with side protection.

### Hand protection

Use protective gloves. The glove material must be sufficiently impermeable and resistant to the substance. Check the tightness before wear. Gloves should be well cleaned before being removed, then stored in a well ventilated location. Pay attention to skin care.

Skin protection cremes do not protect sufficiently against the substance.

The following information is valid for aqueous, saturated solutions of the substance.

The following materials are suitable for protective gloves (Permeation time  $\geq$  8 hours):

Natural rubber/Natural latex - NR (0,5 mm) (use non-powdered and allergen free products)

Polychloroprene - CR (0,5 mm)

Nitrile rubber/Nitrile latex - NBR (0,35 mm)

Butyl rubber - Butyl (0,5 mm)

Fluoro carbon rubber - FKM (0,4 mm)

Polyvinyl chloride - PVC (0,5 mm)

The times listed are suggested by measurements taken at 22 °C and constant contact. Temperatures raised by warmed substances, body heat, etc. and a weakening of the effective layer thickness caused by expansion can lead to a significantly shorter breakthrough time. In case of doubt contact the gloves' manufacturer. A 1.5-times increase / decrease in the layer thickness doubles / halves the breakthrough time. This data only applies to the pure substance. Transferred to mixtures of substances, these figures should only be taken as an aid to orientation.

### Occupational hygiene

Foods, beverages and other articles of consumption must not be consumed at the work areas.

Suitable areas are to be designated for these purposes.

Avoid contact with skin. In case of contact wash skin.

Avoid inhalation of dust.

Avoid contact with clothing. Contaminated clothes must be exchanged and cleaned carefully.

Before a break it might be necessary to change clothes.

Provide washrooms with showers and if possible rooms with separate storage for street clothing and work clothing.

The skin must be washed with soap and water before breaks and at the end of work. Apply fatty skin-care products after washing.

Take care of personal hygiene.

### DISPOSAL CONSIDERATIONS

Hazardous waste according to Waste Catalogue Ordinance (AVV).

If there is no way of recycling it must be disposed of in compliance with the respective national and local regulations.

Collection of small amounts of substance:

Neutral solutions (pH-control):

Place in a collection container for salt solutions, adjust for a pH value of 6-8.

Collection vessels must be clearly labelled with a systematic description of their contents. Store the vessels in a well-ventilated location. Entrust them to the appropriate authorities for disposal.

### ACCIDENTAL RELEASE MEASURES

Evacuate area. Warn affected surroundings.

The hazardous area may only be entered once suitable protective measures are implemented. Only then can the hazardous situation be removed (see chapter Personal Protection).

Pick up without creating dust.

Afterwards ventilate area and wash spill site.

Endangerment of watert:

Low hazard to waters. Inform the responsible authorities when very large quantities get into water, drainage, sewer, or the ground.

### FIRE FIGHTING MEASURES

#### Instructions

Substance is incombustible. Select fire fighting measures according to the surrounding conditions.

#### Special protective equipment

In the case of inclusion in an ambient fire hazardous substances can be released.

Boron oxide

### REGULATIONS

[GHS Classification/Labelling](#) | [Workplace labelling](#) | [Water hazard class](#) | [Air quality control](#) | [Transport Regulations](#) | [Threshold limit values](#) | [REACH](#) | [MAK recommendations](#) | [Biological exposure indeces](#) | [Restriction of use](#) | [Technical rules](#) | [Regulations of accident insurers](#)

## EUROPEAN GHS CLASSIFICATION AND LABELLING

### Classification

Reproductive toxicity, Category 1B; H360FD



**Signal Word** "Danger"

### Hazard Statement - H-phrases

H360FD: May damage fertility or the unborn child.

### Precautionary Statement - P-phrases

P201: Obtain special instructions before use.

P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308+P313: IF exposed or concerned: Get medical advice/attention.

Manufacturer's specification by Thermo Fisher Scientific

Reference: [01231](#)

State: 2023

Checked: 2023

The substance is listed in appendix VI, table 3 of CLP regulation.

The given classification can deviate from the listed classification, since this classification is to be complemented concerning missing or divergent danger classes and categories for the respective substance.

Reference: [99999](#)

## GHS-CLASSIFICATION OF MIXTURES

### Note 11

The classification of mixtures as reproductive toxicant is necessary if the sum of the concentrations of individual boron

compounds that are classified as reproductive toxicant in the mixture as placed on the market is  $\geq 0,3 \%$ .

Reference: [07519](#)

## WORKPLACE LABELLING ACCORDING TO GERMAN [ASR A1.3](#)

### Prohibition label



No Smoking



No admittance for unauthorized persons



No eating and  
drinking

#### Precept label



Use safety goggles



Wear safety  
gloves

#### GERMAN WATER HAZARD CLASS

Substance No: 315

WGK 1 - low hazard to waters

Classification according to the announcement of the list of substances hazardous to water in the Federal Register of 10.08.2017, last update 24.11.2023

#### TECHNICAL INSTRUCTIONS ON AIR QUALITY CONTROL (TA LUFT)

Chapter 5.2.7.1.3 Substances toxic to reproduction

Mass flow: 2,5 g/hr

or

Mass conc.: 1 mg/m<sup>3</sup>

#### TRANSPORT REGULATIONS

Not subject to transport regulations.

Reference: [01231](#)

#### TRGS 900 - GERMAN OCCUPATIONAL EXPOSURE LIMIT VALUES

0,5 mg/m<sup>3</sup>

with reference to the inhalable fraction

Peak limitation: Excursion factor 2

Duration 15 min, mean; 4 times per shift; interval 1 hour

Category I - Substances for which local irritant effects determine the exposure limit value, also respiratory allergens

There is no reason to fear a risk of damage to the developing embryo or foetus when AGW and BGW are adhered to.

Source: AGS

Scope:

Boric acid and sodium borate

The occupational exposure limit value refers to the element content of the corresponding Metal. calculated as boron

## REACH - REGULATION

The substance is specified in the [REACH Candidate list](#) of substances of very high concern for authorisation.

## RECOMMENDATIONS OF MAK-COMMISSION

This data is recommended by scientific experience and is not established law.

10 mg/m<sup>3</sup>

with reference to the inhalable fraction

Peak limitation: Excursion factor 1

Duration 15 min, mean; 4 times per shift; interval 1 hour

Category I - Substances for which local irritant effects determine the exposure limit value, also respiratory allergens

Pregnancy: Group B

According to currently available information damage to the embryo or foetus cannot be excluded after exposure to concentrations at the level of the MAK and BAT values. The documentation indicates, when the Commission's assessment of the data makes it possible, which concentration would correspond to the classification in Pregnancy Risk Group C. Substances with this indication have the footnote "prerequisite for Group C, see documentation".

When boric acid and tetraborates are present together, the MAK value is 0,75 mg boron/m<sup>3</sup> see section 'Metal-working fluids, hydraulic fluids and other lubricants'

## GERMAN BIOLOGICAL EXPOSURE INDICES

Parameter: Boron

Assay material: Urine

Sampling time: difference between urine before shift and urine after shift

There is at present insufficient data for the derivation of a BAT value; however, documentation for this substance has been published.

Reference: [08112](#)

## RESTRICTIONS OF USE / BANS OF USE

### REACH Regulation (EC) No 1907/2006 Annex XVII

Annex XVII, Point 28 and Point 29 and Point 30

The substance shall not be placed on the market or used as a substance or as a constituent of other substances or in mixtures for supply to the general public when the concentration of the substance or mixture reaches or exceeds the concentration limits according to the CLP Regulation. When placing the substance or mixture on the market for professional users, the supplier shall ensure that the packaging of such substances and mixtures is marked with the label "Restricted to professional users." For further details, please refer to the Regulation.

**Annex XVII, Point 75**

Mixtures containing certain hazardous substances shall no longer be placed on the market for tattooing purposes. Mixtures containing such substances in specified concentrations shall no longer be used for tattooing purposes after 04.01.2022. Substances falling within one or more of the following points:

- carcinogenic or reproductive toxic substances according to Part 3 of Annex VI to CLP Regulation (excluding the classification due to effects only following exposure by inhalation),
- skin-sensitising, skin-corrosive, skin-irritant, serious eye-damaging or eye-irritant substances according to Annex VI Part 3 of the CLP Regulation,
- substances listed with specified conditions in Annex II or IV to Regulation (EC) No 1223/2009 [Cosmetics Regulation], and
- substances listed in Appendix 13 to Annex XVII (point 75) of the REACH Regulation.

In general, mixtures placed on the market for use for tattooing purposes must be labelled "Mixture for use in tattoos or permanent make-up." from 04.01.2022 on and may not be used for tattooing purposes without this labelling. Further safety information shall be provided on the packaging or in the instructions for use. Before using a mixture for tattooing purposes, the person using the mixture shall provide this information to the person undergoing the procedure.

Further information on the restrictions, concentration limits and exemptions can be taken from the Regulation.

Annex XVII to Regulation (EC) No 1907/2006, [consolidated version](#) (BAUA) (only in German)

**TECHNICAL RULES FOR HAZARDOUS SUBSTANCES****[TRGS 201](#)**

Einstufung und Kennzeichnung bei Tätigkeiten mit Gefahrstoffen; Ausgabe Februar 2017, zuletzt geändert und ergänzt April 2018

**[TRGS 400](#)**

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**[TRGS 509](#)**

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## LINKS

[Statement concerning the Occupational Exposure Limit Value \(in german only, source BAuA\)](#)  
[International Limit Values](#)  
[Risk Assessment Report](#)  
[ECHA - Candidate List of Substances of Very High Concern for authorisation](#)  
[The MAK Collection for Occupational Health and Safety](#)  
[DGUV Information 213-098: List of substances - lesson in schools \(in German only\)](#)

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Angabe des Bearbeiters

Indication of the editor

[Identification](#) | [Characterisation](#) | [Formula](#) | [Physical and chemical properties](#) |  
[Toxicology / Ecotoxicology](#) | [Occupational health and first aid](#) | [Safe handling](#) | [Regulations](#) | [Links](#) |  
[Literature register](#)

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