Use
ba 6 is a broad spectrum biocide with extremely environmental friendly profile and excellent biofilm removal capacities. ba 6 has been specifically designed for control of planktonic and sessile biofilm micro-organisms in industrial recirculating cooling water systems, such as cooling towers and evaporating cooling towers.

Features
ba 6 is a THPS (Tetrakishydroxymethylphosphoniumsulfat) based biocide. BA6 is very potent against planktonic and sessile bacteria, SRB’s, Legionella and algae. But it is also known for its environmental friendly character.

- low ecotoxicity to aquatic species
- readily biodegradable
- does not bio-accumulate
- halogen free

Appearance: colorless clear liquid
pH (neat): 3.3
Density: 1.110 kg/m³
Freezing point: 0°C
Solubility: complete

These data are to be seen as typical values and should not be considered as specifications.

Dosing
The recommended dosage and concentration depends on the biological contamination and the system size. ba 6 can be dosed directly from the delivery container. The point of injection should be choosed in an area of the system with enough flow to distribute ba 6.
The standard dosing rate of ba 6 is 200 g/m³.

Handling precautions
ba 6 should be handled with care, as all industrial chemicals. In case of skin contact, contaminated clothing should be removed and affected area should be washed with water. In case of eye contact, wash out with plenty of clean water for at least 15 minutes. Obtain medical attention. If you feel unwell, seek medical advice (show the label where possible). Before use review the Material Safety Data Sheet for additional information. Use ba 6 safely. Always read label and product information before use.

Important info
Every our chemical products maintains a Material Safety Data Sheet. Material Safety Data Sheets contain health and safety information relevant for your development of appropriate product handling procedures to protect your employees and customers. The Material Safety Data Sheet should be read and understood by all of your supervisory personnel and employees before using gwk products in your facilities.

Packaging
ba 6 is available in 20kg drums.
SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier
Trade name : ba 6

1.2 Relevant identified uses of the substance or mixture and uses advised against
Use of the Substance/Mixture : Biocidal product
Recommended restrictions on use : For use in industrial installations only. Restricted to professional users.

1.3 Details of the supplier of the safety data sheet
Gwk Gesellschaft Wärme Kältetechnik mbH
Scharl 10
D-58540 Meinerzhagen
Germany

info@gwk.com

1.4 Emergency telephone number
emergency telephone number
Berlin +49 (0) 30 30686700

Product Information
+49 2354 7060 0
Contact your local gwk representative

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

- Acute toxicity, Category 4 : H302: Harmful if swallowed.
- Acute toxicity, Category 4 : H332: Harmful if inhaled.
- Serious eye damage, Category 1 : H318: Causes serious eye damage.
- Skin sensitisation, Category 1 : H317: May cause an allergic skin reaction.
- Reproductive toxicity, Category 2 : H361d: Suspected of damaging the unborn child.
- Acute aquatic toxicity, Category 1 : H400: Very toxic to aquatic life.
- Chronic aquatic toxicity, Category 3 : H412: Harmful to aquatic life with long lasting effects.
2.2 Label elements

**Labelling (REGULATION (EC) No 1272/2008)**

Hazard pictograms:

- ☢️ (Explosive symbol)
- ☠️ (Toxic symbol)
- ⚠️ (Caution symbol)
- 🌳 (Danger symbol)

**Signal word:** Danger

**Hazard statements:**
- H302 + H332: Harmful if swallowed or if inhaled
- H317: May cause an allergic skin reaction.
- H318: Causes serious eye damage.
- H361d: Suspected of damaging the unborn child.
- H410: Very toxic to aquatic life with long lasting effects.

**Precautionary statements:**

**Prevention:**
- P201: Obtain special instructions before use.
- P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
- P273: Avoid release to the environment.
- P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.

**Response:**
- P304 + P340 + P312: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
- P305 + P351 + P338 + P310: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

Hazardous components which must be listed on the label:

[Tetrakis(hydroxymethyl)phosphonium sulphate(2:1)]

2.3 Other hazards

**Additional advice**

No information available.

---

**SECTION 3: Composition/information on ingredients**

3.2 Mixtures

**Hazardous components**
### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

**General advice**: Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance. Do not leave the victim unattended.

**If inhaled**: Move to fresh air. If INHALED: Call a POISON CENTER/doctor if you feel unwell. Keep patient warm and at rest. If unconscious place in recovery position and seek medical advice.

**In case of skin contact**: Remove contaminated clothing. If irritation develops, get medical attention. If on skin, rinse well with water. First aid is not normally required. However, it is recommended that exposed areas be cleaned by washing with soap and water. Wash contaminated clothing before re-use.

**In case of eye contact**: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. Remove contact lenses. Protect unharmed eye.

**If swallowed**: Obtain medical attention. Do NOT induce vomiting. Rinse mouth with water. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

---

For explanation of abbreviations see section 16.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Classification</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetrakis(hydroxymethyl)phosphonium sulphate(2:1)</td>
<td>55566-30-8</td>
<td>259-709-0</td>
<td>Acute Tox.4; H302 Acute Tox.3; H331 Eye Dam.1; H318 Skin Sens.1; H317 Repr.2; H361d Aquatic Acute1; H400 Aquatic Chronic2; H411</td>
<td>&gt;= 15 - &lt; 25</td>
</tr>
</tbody>
</table>
4.2 Most important symptoms and effects, both acute and delayed

Symptoms: No symptoms known or expected.

Risks:
- Harmful if swallowed or if inhaled
- May cause an allergic skin reaction.
- Causes serious eye damage.
- Suspected of damaging the unborn child.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment: No hazards which require special first aid measures.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Water spray
- Foam
- Carbon dioxide (CO2)
- Dry chemical

Unsuitable extinguishing media: High volume water jet

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting: Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous combustion products: No hazardous combustion products are known

5.3 Advice for firefighters

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus.

Specific extinguishing methods: Product is compatible with standard fire-fighting agents.

Further information: Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions: Use personal protective equipment.
Ensure adequate ventilation.
Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.
Comply with all applicable federal, state, and local regulations.

6.2 Environmental precautions

Environmental precautions: Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up: Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For further information see Section 8 and Section 13 of the safety data sheet.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling: Do not breathe vapours/dust.
Do not smoke.
Persons susceptible to skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
Container hazardous when empty.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
Smoking, eating and drinking should be prohibited in the application area.
For personal protection see section 8.
Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion: Normal measures for preventive fire protection.

Hygiene measures: Wash hands before breaks and at the end of workday. When using do not eat or drink. When using do not smoke.
7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers: Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Observe label precautions. Electrical installations / working materials must comply with the technological safety standards.

Storage class (TRGS 510): 12, Non Combustible Liquids

Other data: No decomposition if stored and applied as directed.

7.3 Specific end use(s)

Specific use(s): No data available

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Engineering measures

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

Personal protective equipment

Eye protection: Wear chemical splash goggles and face shield when there is potential for exposure of the eyes or face to liquid, vapor or mist. Maintain eye wash station in immediate work area.

Hand protection

Remarks: butyl-rubber

The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Skin and body protection: Wear as appropriate:

- Impervious clothing
- Safety shoes
- Choose body protection according to the amount and concentration of the dangerous substance at the work place.
- Discard gloves that show tears, pinholes, or signs of wear.
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance : Aqueous solution

Colour : yellow

Odour : No data available

Odour Threshold : No data available

pH : ca. 4.3, (25 °C)

Melting point/freezing point : ca. -3 °C

Boiling point/boiling range : ca. 108 °C Flash point

Evaporation rate : No data available

Flammability (solid, gas) : No data available

Upper explosion limit : No data available

Lower explosion limit : No data available

Vapour pressure : 23.33 hPa (20 °C) Calculated Vapor Pressure

Relative vapour density : No data available

Relative density : ca. 1.12

Density : ca. 1.12 g/cm³

Solubility(ies)

Water solubility : completely soluble

Solubility in other solvents : No data available

Partition coefficient: n-octanol/water : No data available

Thermal decomposition : No data available

Viscosity
9.2 Other information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No decomposition if stored and applied as directed.

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Hazardous reactions : Product will not undergo hazardous polymerization.

10.4 Conditions to avoid

10.5 Incompatible materials

10.6 Hazardous decomposition products
Hazardous decomposition products : No hazardous decomposition products are known.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Information on likely routes of exposure : Inhalation
                                            Skin contact
                                            Eye Contact
                                            Ingestion

Acute toxicity
Harmful if swallowed or if inhaled

Product:
Acute oral toxicity : Assessment: The component/mixture is moderately toxic after single ingestion.

Acute inhalation toxicity : Assessment: The component/mixture is moderately toxic after
short term inhalation.

**Components:**

**PHOSPHONIUM, TETRAKIS(HYDROXYMETHYL)-, SULFATE (2:1):**

- **Acute oral toxicity:** LD 50 (Rat): 575 mg/kg
- **Acute inhalation toxicity:**
  - LC 50 (Rat): 5.5 mg/l
  - Exposure time: 4 h
  - LC 50 (Rat): 0.59 mg/l
  - Exposure time: 4 h
  - Test atmosphere: dust/mist
  - Remarks: Information given is based on data obtained from similar substances.

**Skin corrosion/irritation**

Not classified based on available information.

**Product:**

Remarks: May cause skin irritation in susceptible persons.

**Components:**

**PHOSPHONIUM, TETRAKIS(HYDROXYMETHYL)-, SULFATE (2:1):**

- **Species:** Rabbit
- **Method:** OECD Test Guideline 404
- **Result:** Not irritating to skin

**Serious eye damage/eye irritation**

Causes serious eye damage.

**Product:**

Result: Risk of serious damage to eyes.

Remarks: May cause irreversible eye damage.

**Components:**

**PHOSPHONIUM, TETRAKIS(HYDROXYMETHYL)-, SULFATE (2:1):**

- **Species:** Rabbit
- **Result:** Risk of serious damage to eyes.

**Respiratory or skin sensitisation**

Skin sensitisation: May cause an allergic skin reaction.
Respiratory sensitisation: Not classified based on available information.

**Product:**

Remarks: May cause allergic skin reaction.
Components:
PHOSPHONIUM, TETRAKIS(HYDROXYMETHYL)-, SULFATE (2:1):

Test Type: Maximisation Test
Assessment: May cause sensitisation by skin contact.
Method: OECD Test Guideline 406

Germ cell mutagenicity
Not classified based on available information.

Carcinogenicity
Not classified based on available information.

Reproductive toxicity
Suspected of damaging the unborn child.

Components:
PHOSPHONIUM, TETRAKIS(HYDROXYMETHYL)-, SULFATE (2:1):

Reproductive toxicity -
Assessment: Some evidence of adverse effects on development, based on animal experiments., Suspected of damaging the unborn child.

STOT - single exposure
Not classified based on available information.

STOT - repeated exposure
Not classified based on available information.

Aspiration hazard
Not classified based on available information.

Further information

Product:
Remarks: No data available

SECTION 12: Ecological information

12.1 Toxicity

Product:
Toxicity to algae: EC50 (Skeletonema costatum (marine diatom)): Expected 0,5 mg/l
Exposure time: 96 h

Components:
Tetrakis(hydroxymethyl)phosphonium sulphate(2:1)
Toxicity to fish: LC 50 (Oncorhynchus mykiss (rainbow trout)): 119 mg/l
Exposure time: 96 h
Test substance: 75% solution

Toxicity to daphnia and other aquatic invertebrates:
LC 50 (Lepomis macrochirus (Bluegill sunfish)): 93 mg/l
Exposure time: 96 h
Test substance: 75% solution

Toxicity to algae:
EC 50 (Pseudokirchneriella subcapitata (green algae)): 0,20 mg/l
Exposure time: 96 h
Test substance: 75% solution

Toxicity to bacteria:
EC 50 (activated sludge): 24 mg/l
Exposure time: 3 h
Test substance: 75% solution

Toxicity to fish (Chronic toxicity):
NOEC: 1.1 mg/l
Exposure time: 32 d
Species: Pimephales promelas (fathead minnow)
Test substance: 75% solution

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC: 0.032 mg/l
Exposure time: 21 d
End point: Reproduction Test
Species: Daphnia magna (Water flea)
Test substance: 75% solution

12.2 Persistence and degradability

Product:
Biodegradability:
Remarks: Readily biodegradable

Components:
Tetrakis(hydroxymethyl)phosphonium sulphate(2:1)
Biodegradability:
Result: Readily biodegradable

12.3 Bioaccumulative potential

Product:
Bioaccumulation:
Remarks: The bioaccumulation potential cannot be determined.

12.4 Mobility in soil
No data available
12.5 Results of PBT and vPvB assessment
Not relevant

12.6 Other adverse effects

**Product:**
Additional ecological information: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal., Very toxic to aquatic life., Harmful to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

**Product:** The product should not be allowed to enter drains, water courses or the soil.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Send to a licensed waste management company.

**Contaminated packaging:** Empty remaining contents.
Dispose of as unused product.
Empty containers should be taken to an approved waste handling site for recycling or disposal.
Do not re-use empty containers.

SECTION 14: Transport information

14.1 UN number

**ADR:** UN3082
**ADNR:** UN3082
**RID:** UN3082

**INTERNATIONAL MARITIME DANGEROUS GOODS:** UN3082
**INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO:** UN3082
**INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER:** UN3082

14.2 UN proper shipping name

**ADR:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TETRAKIS[HYDROXYMETHYL]PHOSPHONIUM SULFATE)
**ADNR:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TETRAKIS[HYDROXYMETHYL]PHOSPHONIUM SULFATE)
**RID:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TETRAKIS[HYDROXYMETHYL]PHOSPHONIUM SULFATE)
**INTERNATIONAL MARITIME DANGEROUS GOODS:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TETRAKIS[HYDROXYMETHYL]PHOSPHONIUM SULFATE)
INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO: Environmentally hazardous substance, liquid, n.o.s. (TETRAKIS[HYDROXYMETHYL]PHOSPHONIUM SULFATE)
INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER: Environmentally hazardous substance, liquid, n.o.s. (TETRAKIS[HYDROXYMETHYL]PHOSPHONIUM SULFATE)

14.3 Transport hazard class(es)
ADR: 9
ADNR: 9
RID: 9

INTERNATIONAL MARITIME DANGEROUS GOODS: 9

14.4 Packing group
ADR: III
ADNR: III
RID: III

INTERNATIONAL MARITIME DANGEROUS GOODS: III

14.5 Environmental hazards
ADR: Environmentally hazardous
ADNR: Environmentally hazardous
RID: Environmentally hazardous

INTERNATIONAL MARITIME DANGEROUS GOODS: Environmentally hazardous, MARINE POLLUTANT

14.6 Special precautions for user
Not applicable

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
Ship Type: Not applicable
Pollutant: Not applicable

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.
SECTION 15: Regulatory information

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

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 57): Not applicable

REACH - List of substances subject to authorisation (Annex XIV): Not applicable

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII): Not applicable

Regulation (EC) No 850/2004 on persistent organic pollutants: Not applicable


<table>
<thead>
<tr>
<th>E1</th>
<th>ENVIRONMENTAL HAZARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity 1</td>
<td>100 t</td>
</tr>
<tr>
<td>Quantity 2</td>
<td>200 t</td>
</tr>
</tbody>
</table>

Water contaminating class (Germany) : WGK 3 highly water endangering

TA Luft List (Germany) : Total dust, Not applicable

: Inorganic substances in powdered form, Not applicable

: Inorganic substances in vapour or gaseous form, Not applicable

: Organic Substances, Not applicable

: Carcinogenic substances, Not applicable

: Mutagenic, Not applicable

: Toxic to reproduction, Not applicable

Other regulations : Young people under 18 years old are not allowed to work with this product according to the EU Directive 94/33/EC on the protection of young people at work.

Pregnant women may only work with or be exposed to this product if, based on a risk assessment in the context of the activities and risk management measures taken, the exposure
15.2 Chemical safety assessment

No data available

SECTION 16: Other information

Further information
Revision Date: 18.04.2016

Full text of H-Statements referred to under section 3.

<table>
<thead>
<tr>
<th>H</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>H302</td>
<td>Harmful if swallowed.</td>
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<td>Causes serious eye damage.</td>
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<tr>
<td>H331</td>
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</tr>
<tr>
<td>H361d</td>
<td>Suspected of damaging the unborn child.</td>
</tr>
<tr>
<td>H400</td>
<td>Very toxic to aquatic life.</td>
</tr>
<tr>
<td>H411</td>
<td>Toxic to aquatic life with long lasting effects.</td>
</tr>
</tbody>
</table>

Further information

Other information: The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the
company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

Sources of key data used to compile the Safety Data Sheet
Key literature references and sources of data
SOLENIS Internal data
SOLENIS internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet:

- **ACGIH**: American Conference of Industrial Hygienists
- **BEI**: Biological Exposure Index
- **CAS**: Chemical Abstracts Service (Division of the American Chemical Society).
- **CMR**: Carcinogenic, Mutagenic or Toxic for Reproduction
- **FG**: Food grade
- **GHS**: Globally Harmonized System of Classification and Labeling of Chemicals.
- **H-statement**: Hazard Statement
- **IATA**: International Air Transport Association.
- **IATA-DGR**: Dangerous Goods Regulation by the “International Air Transport Association” (IATA).
- **ICAO**: International Civil Aviation Organization
- **ICAO-TI** (ICAO): Technical Instructions by the “International Civil Aviation Organization”
- **IMDG**: International Maritime Code for Dangerous Goods
- **ISO**: International Organization for Standardization
- **logPow**: octanol-water partition coefficient
- **LCxx**: Lethal Concentration, for xx percent of test population
- **LDxx**: Lethal Dose, for xx percent of test population.
- **ICxx**: Inhibitory Concentration for xx of a substance
- **Ecxx**: Effective Concentration of xx
- **N.O.S.**: Not Otherwise Specified
- **OECD**: Organization for Economic Co-operation and Development
- **OEL**: Occupational Exposure Limit
- **P-Statement**: Precautionary Statement
- **PBT**: Persistent, Bioaccumulative and Toxic
- **PPE**: Personal Protective Equipment
- **STEL**: Short-term exposure limit
- **STOT**: Specific Target Organ Toxicity
- **TLV**: Threshold Limit Value
- **TWA**: Time-weighted average
- **vPvB**: Very Persistent and Very Bioaccumulative
- **WEL**: Workplace Exposure Level

- **ABM**: Water Hazard Class for the Netherlands
- **ADR**: Agreement concerning the International Carriage of Dangerous Goods by Road.
| ADNR: Regulation for the Carriage of Dangerous Substances on the Rhine |
| CLP: Classification, Labelling and Packaging |
| CSA: Chemical Safety Assessment |
| CSR: Chemical Safety Report |
| DNEL: Derived No Effect Level. |
| EINECS: European Inventory of Existing Commercial Chemical Substances. |
| ELINCS: European List of Notified Chemical Substances |
| PEC: Predicted Effect Concentration |
| PEL: Permissible Exposure Limits |
| PNEC: Predicted No Effect Concentration |
| REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals |
| RID: Regulation Concerning the International Transport of Dangerous Goods by Rail |
| WGK: German Water Hazard Class |