# Kao Corporation

Enriching lives,
in harmony with nature.

## Benzalkonium chloride

The document of the safety summary provides the safety information of the chemical substance to the general public. The safety summary is NOT intended to be an alternative document of Safety Data Sheet which is described from the recommendable detailed safety measures for each use. The safety summary is NOT intended to be an alternate document of the instructions for use nor the warning of consumer products including this substance. The contents of this summary are based on the laws, documents, information, and data available at present, without any warranty.

## 1. Chemical Identity

| | |
|---|---|
| Category Name | Benzalkonium chloride |
| Substance Name | Benzyldimethyloctylammonium chloride<br>Alkyl (C12-16) dimethylbenzylammonium chloride |
| CAS Number | 959-55-7, 68424-85-1 |

## 2. Product Uses and Benefits

Benzalkonium chloride (BAC) is an anionic surfactant. It is widely used in consumer products contained in laundry detergents, household detergents, shampoo, hand cleaner and others.

## 3. Physical/Chemical Properties

As the representative structure of BAC, the physicochemical properties of C8-BAC and C12-BAC with the numbers of carbon of the alkyl group of 8 and 12 were calculated using computer software EPI suite 4.11 of the U.S. Environmental Protection Agency or measured values are shown below.

Physicochemical properties of BAC

| Property | Alkyl chain length | |
|---|---|---|
| | C8 | C12 |
| Molecular weight | 283.89 | 340.00 |
| Boiling point (℃) | 491.21 | 537.63 |
| Melting point (℃) | 208.49 | 230.18 |
| Vapor pressure (Pa, at 25℃) | $6.9\times10^{-8}$ | $2.51\times10^{-9}$ |
| Water solubility (mg/L) | 2287 | 22.47 |
| Octanol/water partition coefficient (Log Kow) | 0.96 | 2.93 |
| Soil adsorption coefficient (Log Koc) | 4.39 | 5.43 |

## 4. Human Health Safety Assessment

Consumer: The exposure to BAC is at safe levels.
Worker: The repeated exposure of BAC does not cause any toxic effects

| Effect Assessment | Result |
|---|---|
| Acute Toxicity<br>oral/ dermal | Harmful if swallowed<br>The substance does not cause damage to any organs following single exposure |
| Irritation<br>skin/ eye | Undiluted substance causes moderate to severe skin irritation and serious eye damage |
| Sensitization | Based on the available data, unlikely to cause allergic skin reaction |
| Toxicity after repeated exposure | Unlikely to cause any toxic effects through prolonged or repeated oral exposure in practical use |
| Mutagenicity | Based on the available data, unlikely to cause genetic defects |
| Carcinogenicity | Based on the available data, unlikely to cause cancer |
| Toxicity for reproduction | Based on the available data, unlikely to be damaging to fertility or the unborn child |

## 5. Environmental Safety Assessment

The test results with fish, aquatic invertebrates and algae suggest that BAC could cause a strong toxicity for aquatic organism and a long-term harmful effect to aquatic organisms. However, BAC is unlikely to persist in the environment because of the readily biodegradation. BAC does not bioaccumulate in the food chain.

| Effect Assessment | Result |
|---|---|
| Aquatic Toxicity | Suggests to cause toxicity for aquatic organism and harmful to aquatic life with long lasting effects |
| Biodegradation | Readily biodegradable |

| Effect Assessment | Result |
|---|---|
| PBT/ vPvB conclusion* | It is not applicable to PBT / vPvB |

*PBT=Persistent, Bioaccumulative and Toxic
vPvB=Very Persistent and Very Bioaccumulative

## 6. Exposure

- **Consumer**

The consumer can come into contact with the substance in use of the detergents, but the concentration of BAC in use is below the level which would give rise harmful effects of concern. When it's used as the recommended use, consumer should always read product information before use and follow the label/ use instructions.

- **Worker**

The exposure can occur either in BAC manufacturing facilities or in the various industrial facilities when BAC is used. Those workers in industrial operations during maintenance, sampling, testing, or other procedures could be exposed with BAC. Only qualified and trained workers handle the undiluted substance. The manufacturing facilities offer thorough training program for employees and appropriate work processes, as well as safety equipment (goggles and gloves) in place to present an unnecessary exposure. Safety showers and eye-wash stations are accessible nearby. Workers are required to be trained in accordance with the safety measures in the Safety Data Sheet.

- **Environment**

Since this substance is used extensively, it is discharged to waste water treatment plants from industrial sites such as manufacturing, preparation, handling, storage and use of the substance as well as from consumer households. However, the substance is readily biodegradable, so that it is removed efficiently in waste water treatment plants. The substance is biologically degraded in the surface water and is rapidly removed even if it is remained slightly in the waste water. Hence, the chronic exposure to aquatic organisms of the substance is unlikely to occur. Furthermore, the substance dose not accumulate in the food chain, so that there is no concern of human exposure through environmental pathway.

## 7. Risk management recommendations

When you use the substance, make sure to be measured the adequate ventilation. Always use appropriate chemical-resistant gloves to protect your hands and skin and always wear eye protection equipment. Do not eat, drink or smoke where the substance is handled, processed or stored. Wash hands and skin after contact with the substance. When the substance attaches to skin (or hair), take off the contaminated clothes. Wash with a large amount of water and soap. When it causes your skin irritation, consult doctor (medical diagnosis/therapy). If the substance gets into your eyes, rinse your eyes thoroughly for several minutes. If you wear contact lens, and you can take it off easily, take it off and continue to rinse your eyes. When eye irritation persists, consult doctor (medical diagnosis/therapy).

Waste water containing the substance must be passed the waste water treatment plants in order to remove the substance. No specific measures for ventilation are needed, because it is not expected to be released into the air.

## 8. Regulatory Information/Classification and Labeling

Under GHS classification, chemical substances are classified in hazards for physical properties, human health and environment. The hazard information for industrial products are transmitted via specific labels and Safety Data Sheet. GHS offers the standardization for hazard communication. The subjects who could be assumed to be exposed to the substance, workers, consumers, transport workers, and emergency responders, can better understand the hazards of the chemicals in use through the transmission.

### Labeling according to UN GHS

UN GHS is the basis for country specific GHS labeling.

BAC is assigned to following GHS classification.

### Classification and labelling information

Acute Tox. 4

Skin Corr. 1

Eye Dam. 1

Aquatic Acute 1

Aquatic Chronic 1

### Hazard Statements:

H302: Harmful if swallowed

H314: Causes severe skin burns and eye damage

H318: Causes serious eye damage

H400: Toxic to aquatic life

H410: Harmful to aquatic life with long lasting effects

### Signal Word

Danger

The laws of manufacturing, sale, transport, use and disposal are different among countries or areas. Details are referred to Safety Data Sheet provided by the supplier.

## 9. Conclusion

Though BAC is suggested to cause strong toxicity to aquatic organisms, the risk to environment organisms is negligible due to the rapid degradation of BAC. In the PBT/vPvB

assessments for BAC, the substance is not applicable to PBT/vPvB. Contact with the undiluted BAC may cause irritation to the skin and serious damage to the eyes. When handling the substance, workers should follow the standard safety measures and refer to the Safety Data Sheet. Consumers will usually not come into contact with the substance bulk and the diluted substance is used in consumer products, therefore, it is considered that BAC gives rise no hazardous effects to human health.

## 10. Contact

For further information on this substance or Safety Summary in general, please contact us.

| | |
|---|---|
| Name | Kao Corporation |
| URL | https://ssl.kao.com/en/chemical/ |

## 11. Glossary

| | |
|---|---|
| Hazard | Hazardous property for human health or environments |
| GHS | Globally Harmonized System of Classification and Labelling of Chemicals |
| Acute Toxicity | Adverse effects that result from a single exposure |
| Sensitization | Inducibility of allergy |
| Mutagenicity | Effects to induce gene mutations |
| Toxicity after repeated exposure | Adverse effects that result from repeated exposure |
| Toxicity for reproduction | Adverse effects for teratogenicity, embryotoxicity, and reproductivity |
| Carcinogenicity | Action influence to cause a cancer |
| Biodegradation | Biological degradation of a substance in environments |
| Bioaccumulation | Accumulation of substances in environments |

## 12. Date of Issue

June 14, 2019