SAFETY DATA SHEET

Benzalkonium chloride powder

According to Regulation (EC) No 1907/2006, Annex II, as amended. Commission Regulation (EU) No 2015/830 of 28 May 2015.

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

1.1. Product identifier

Product name Benzalkonium chloride powder

Product number 29089235

CAS number 8001-54-5

EC number 616-786-9

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

Uses advised against For research and development purposes. Not suitable for human consumption or veterinary purposes.

1.3. Details of the supplier of the safety data sheet

Supplier

Molekula Ltd.
Lingfield Way,
Darlington,
DL1 4XX,
United Kingdom
+44 (0) 3302000333
info@molekula.com

1.4. Emergency telephone number

+44 (0) 7769276927

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards Not Classified

Health hazards Acute Tox. 3 - H301 Acute Tox. 4 - H312 Acute Tox. 4 - H332 Skin Corr. 1B - H314 Eye Dam. 1 - H318

Environmental hazards Aquatic Acute 1 - H400 Aquatic Chronic 1 - H410

2.2. Label elements

EC number 616-786-9

Hazard pictograms

Signal word Danger

Benzalkonium chloride powder

Hazard statements

H301 Toxic if swallowed.
H312+H332 Harmful in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements

P260 Do not breathe dust.
P264 Wash contaminated skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P302+P352 IF ON SKIN: Wash with plenty of water.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTRE/doctor if you feel unwell.
P362+P364 Take off contaminated clothing and wash it before reuse.
P363 Wash contaminated clothing before reuse.
P391 Collect spillage.
P405 Store locked up.
P501 Dispose of contents/ container in accordance with national regulations.

2.3. Other hazards

This substance is not classified as PBT or vPvB according to current EU criteria.

SECTION 3: Composition/information on ingredients

3.1. Substances

Product name Benzalkonium chloride powder

CAS number 8001-54-5

EC number 616-786-9

Chemical formula C6H5CH2N(CH3)2RCl (R=C8H17 to C18H37)

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

Get medical attention if any discomfort continues. Show this Safety Data Sheet to the medical personnel. Chemical burns must be treated by a physician.

Inhalation

Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as collar, tie or belt. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Get medical attention. Place unconscious person on their side in the recovery position and ensure breathing can take place.

Ingestion

Get medical attention immediately. Rinse mouth thoroughly with water. Give a few small glasses of water or milk to drink. Stop if the affected person feels sick as vomiting may be dangerous. Never give anything by mouth to an unconscious person. Place unconscious person on their side in the recovery position and ensure breathing can take place. Keep affected person under observation.

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Skin contact	It is important to remove the substance from the skin immediately. Rinse immediately with plenty of water. Continue to rinse for at least 15 minutes and get medical attention. Chemical burns must be treated by a physician.
Eye contact	Rinse immediately with plenty of water. Do not rub eye. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes and get medical attention.
Protection of first aiders	It may be dangerous for first aid personnel to carry out mouth-to-mouth resuscitation.

4.2. Most important symptoms and effects, both acute and delayed

General information	The severity of the symptoms described will vary dependent on the concentration and the length of exposure.
Inhalation	A single exposure may cause the following adverse effects: Severe irritation of nose and throat. Symptoms following overexposure may include the following: Corrosive to the respiratory tract.
Ingestion	May cause chemical burns in mouth, oesophagus and stomach. Symptoms following overexposure may include the following: Severe stomach pain. Nausea, vomiting.
Skin contact	Causes severe burns. Symptoms following overexposure may include the following: Pain or irritation. Redness. Blistering may occur.
Eye contact	Causes serious eye damage. Symptoms following overexposure may include the following: Pain. Profuse watering of the eyes. Redness.

4.3. Indication of any immediate medical attention and special treatment needed

Notes for the doctor	Treat symptomatically. Keep affected person under observation.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog. Use fire-extinguishing media suitable for the surrounding fire.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards	This product is toxic. Severe corrosive hazard. Water used for fire extinguishing, which has been in contact with the product, may be corrosive.
Hazardous combustion products	Thermal decomposition or combustion products may include the following substances: Very toxic or corrosive gases or vapours. Carbon monoxide (CO). Carbon dioxide (CO_2). Nitrous gases (NOx).

5.3. Advice for firefighters

Protective actions during firefighting	Avoid breathing fire gases or vapours. Evacuate area. Keep upwind to avoid inhalation of gases, vapours, fumes and smoke. Ventilate closed spaces before entering them. Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out. Avoid discharge to the aquatic environment. Control run-off water by containing and keeping it out of sewers and watercourses. If risk of water pollution occurs, notify appropriate authorities.
Special protective equipment for firefighters	Regular protection may not be safe. Wear chemical protective suit. Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Firefighter's clothing conforming to European standard EN469 (including helmets, protective boots and gloves) will provide a basic level of protection for chemical incidents.

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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Wear protective clothing as described in Section 8 of this safety data sheet. No action shall be taken without appropriate training or involving any personal risk. Do not touch or walk into spilled material. Avoid inhalation of dust. Use suitable respiratory protection if ventilation is inadequate. Avoid contact with skin and eyes.

6.2. Environmental precautions

Environmental precautions Avoid discharge into drains or watercourses or onto the ground. Avoid discharge to the aquatic environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Wear protective clothing as described in Section 8 of this safety data sheet. Clear up spills immediately and dispose of waste safely. This product is corrosive. Provide adequate ventilation. Collect spillage with a shovel and broom, or similar and reuse, if possible. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Wash thoroughly after dealing with a spillage. Dangerous for the environment. Do not empty into drains. For waste disposal, see Section 13.

6.4. Reference to other sections

Reference to other sections For personal protection, see Section 8. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Read and follow manufacturer's recommendations. Wear protective clothing as described in Section 8 of this safety data sheet. Keep away from food, drink and animal feeding stuffs. Keep container tightly sealed when not in use. This product is toxic. This product is corrosive. Immediate first aid is imperative. Avoid discharge to the aquatic environment. Do not handle until all safety precautions have been read and understood. Do not handle broken packages without protective equipment. Do not reuse empty containers.

Advice on general occupational hygiene Wash promptly if skin becomes contaminated. Take off contaminated clothing. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Store away from incompatible materials (see Section 10). Store locked up. Keep only in the original container. Keep container tightly closed, in a cool, well ventilated place. Keep containers upright. Protect containers from damage.

Air sensitive. Store under inert gas.

Storage class Toxic storage.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure controls/Personal protection

8.1. Control parameters

TWA

STEL

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Remarks

WEL

8.2. Exposure controls

Protective equipment

Appropriate engineering controls	Provide adequate general and local exhaust ventilation. Ensure the ventilation system is regularly maintained and tested. Good general ventilation should be adequate to control worker exposure to airborne contaminants. Observe any occupational exposure limits for the product or ingredients.
Eye/face protection	Wear tight-fitting, chemical splash goggles or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
Hand protection	Wear protective gloves. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. To protect hands from chemicals, gloves should comply with European Standard EN374. Considering the data specified by the glove manufacturer, check during use that the gloves are retaining their protective properties and change them as soon as any deterioration is detected. Frequent changes are recommended.
Other skin and body protection	Wear appropriate clothing to prevent any possibility of skin contact.
Hygiene measures	Wash after use and before eating, smoking and using the toilet. Do not eat, drink or smoke when using this product.
Respiratory protection	Ensure all respiratory protective equipment is suitable for its intended use and is ‘CE’-marked. Check that the respirator fits tightly and the filter is changed regularly. Gas and combination filter cartridges should comply with European Standard EN14387. Full face mask respirators with replaceable filter cartridges should comply with European Standard EN136. Half mask and quarter mask respirators with replaceable filter cartridges should comply with European Standard EN140.
Environmental exposure controls	Keep container tightly sealed when not in use. Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Solid or liquid (may vary).
Colour	White. Yellow-white.
Odour	Almost odourless.
Odour threshold	No information available.
pH	No information available.
Melting point	30 - 40°C/86 - 104°F
Initial boiling point and range	> 140°C/284°F
Flash point	No information available.

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Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Upper/lower flammability or explosive limits	No information available.
Vapour pressure	No information available.
Vapour density	No information available.
Relative density	0.98
Solubility(ies)	4000 g/l water @ 20°C/68°F Soluble in the following materials: Acetone. Ethanol. Methanol.
Partition coefficient	No information available.
Auto-ignition temperature	No information available.
Decomposition Temperature	No information available.

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	See the other subsections of this section for further details.

10.2. Chemical stability

Stability	Stable at normal ambient temperatures and when used as recommended. Stable under the prescribed storage conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	No potentially hazardous reactions known.

10.4. Conditions to avoid

Conditions to avoid	Air sensitive. Store under inert gas. Protect from moisture.

10.5. Incompatible materials

Materials to avoid	Strong oxidising agents.

10.6. Hazardous decomposition products

Hazardous decomposition products	Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Corrosive gases or vapours. Carbon monoxide (CO). Carbon dioxide (CO_2). Nitrous gases (NOx).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity - oral

Summary	Toxic if swallowed.
Acute toxicity oral (LD_{50} mg/kg)	240.0
Species	Rat
ATE oral (mg/kg)	240.0

Acute toxicity - dermal

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Summary	Harmful in contact with skin.
Acute toxicity dermal (LD_{50} mg/kg)	1,420.0
Species	Rat
ATE dermal (mg/kg)	1,420.0

Acute toxicity - inhalation

Summary	Harmful if inhaled.
ATE inhalation (dusts/mists mg/l)	1.5

Skin corrosion/irritation

Summary	Causes severe skin burns and eye damage.

Serious eye damage/irritation

Summary	Causes serious eye damage.

Respiratory sensitisation

Summary	Based on available data the classification criteria are not met.

Skin sensitisation

Summary	Based on available data the classification criteria are not met.

Germ cell mutagenicity

Summary	Based on available data the classification criteria are not met.

Carcinogenicity

Summary	Based on available data the classification criteria are not met.
IARC carcinogenicity	None of the ingredients are listed or exempt.

Reproductive toxicity

Summary	Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure

Summary	Based on available data the classification criteria are not met.

Specific target organ toxicity - repeated exposure

Summary	Based on available data the classification criteria are not met.

Aspiration hazard

Summary	Not relevant. Solid.

General information	The severity of the symptoms described will vary dependent on the concentration and the length of exposure.
Inhalation	Corrosive to the respiratory tract. Symptoms following overexposure may include the following: Severe irritation of nose and throat.
Ingestion	May cause chemical burns in mouth, oesophagus and stomach. Symptoms following overexposure may include the following: Severe stomach pain. Nausea, vomiting.
Skin contact	Causes severe burns. Symptoms following overexposure may include the following: Pain or irritation. Redness. Blistering may occur.

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Eye contact	Causes serious eye damage. Symptoms following overexposure may include the following: Pain. Profuse watering of the eyes. Redness.
Route of exposure	Ingestion Inhalation Skin and/or eye contact
Target organs	No specific target organs known.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic toxicity

Summary	Very toxic to aquatic life.
LE(C)$_{50}$	0.01 < L(E)C50 ≤ 0.1
M factor (Acute)	10

Chronic aquatic toxicity

Summary	Very toxic to aquatic life with long lasting effects.
M factor (Chronic)	10

12.2. Persistence and degradability

Persistence and degradability	The degradability of the product is not known.

12.3. Bioaccumulative potential

Bioaccumulative potential	No data available on bioaccumulation.
Partition coefficient	No information available.

12.4. Mobility in soil

Mobility	No data available.

12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects

Other adverse effects	None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

General information	The generation of waste should be minimised or avoided wherever possible. Reuse or recycle products wherever possible. This material and its container must be disposed of in a safe way. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. Empty containers or liners may retain some product residues and hence be potentially hazardous.
Disposal methods	Do not empty into drains. Dispose of surplus products and those that cannot be recycled via a licensed waste disposal contractor. Waste, residues, empty containers, discarded work clothes and contaminated cleaning materials should be collected in designated containers, labelled with their contents. Incineration or landfill should only be considered when recycling is not feasible.

SECTION 14: Transport information

General	For limited quantity packaging/limited load information, consult the relevant modal documentation using the data shown in this section.

14.1. UN number

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UN No. (ADR/RID)	2923
UN No. (IMDG)	2923
UN No. (ICAO)	2923
UN No. (ADN)	2923

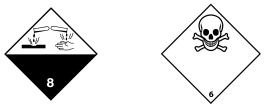
14.2. UN proper shipping name

Proper shipping name (ADR/RID)	CORROSIVE SOLID, TOXIC, N.O.S. (Benzalkonium chloride powder)
Proper shipping name (IMDG)	CORROSIVE SOLID, TOXIC, N.O.S. (Benzalkonium chloride powder)
Proper shipping name (ICAO)	CORROSIVE SOLID, TOXIC, N.O.S. (Benzalkonium chloride powder)
Proper shipping name (ADN)	CORROSIVE SOLID, TOXIC, N.O.S. (Benzalkonium chloride powder)

14.3. Transport hazard class(es)

ADR/RID class	8
ADR/RID subsidiary risk	6.1
ADR/RID classification code	CT2
ADR/RID label	8
IMDG class	8
IMDG subsidiary risk	6.1
ICAO class/division	8
ICAO subsidiary risk	6.1
ADN class	8
ADN subsidiary risk	6.1

Transport labels



14.4. Packing group

ADR/RID packing group	III
IMDG packing group	III
ICAO packing group	III
ADN packing group	III

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant

14.6. Special precautions for user

Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

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EmS	F-A, S-B
ADR transport category	2
Emergency Action Code	2X
Hazard Identification Number (ADR/RID)	86
Tunnel restriction code	(E)

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

SECTION 15: Regulatory information

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

National regulations	Health and Safety at Work etc. Act 1974 (as amended). The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009 No. 1348) (as amended) ["CDG 2009"]. EH40/2005 Workplace exposure limits.
EU legislation	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended). Commission Regulation (EU) No 2015/830 of 28 May 2015. Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

15.2. Chemical safety assessment

No chemical safety assessment has been carried out.

Inventories

EU - EINECS/ELINCS

None of the ingredients are listed or exempt.

SECTION 16: Other information

Abbreviations and acronyms used in the safety data sheet	ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road. ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways. RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail. IATA: International Air Transport Association. ICAO: Technical Instructions for the Safe Transport of Dangerous Goods by Air. IMDG: International Maritime Dangerous Goods. CAS: Chemical Abstracts Service. ATE: Acute Toxicity Estimate. LC_{50}: Lethal Concentration to 50 % of a test population. LD_{50}: Lethal Dose to 50% of a test population (Median Lethal Dose). EC_{50}: 50% of maximal Effective Concentration. PBT: Persistent, Bioaccumulative and Toxic substance. vPvB: Very Persistent and Very Bioaccumulative.

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Classification abbreviations and acronyms	Acute Tox. = Acute toxicity Eye Dam. = Serious eye damage Skin Corr. = Skin corrosion Aquatic Acute = Hazardous to the aquatic environment (acute) Aquatic Chronic = Hazardous to the aquatic environment (chronic)
Classification procedures according to Regulation (EC) 1272/2008	Acute Tox. 3 - H301: Acute Tox. 4 - H312: Acute Tox. 4 - H332: Eye Dam. 1 - H318: Skin Corr. 1B - H314: : Expert judgement. Aquatic Acute 1 - H400: Aquatic Chronic 1 - H410: : Expert judgement.
Training advice	Only trained personnel should use this material.
Revision date	11/05/2021
Revision	2
Supersedes date	10/05/2021
SDS number	113
Hazard statements in full	H301 Toxic if swallowed. H312 Harmful in contact with skin. H314 Causes severe skin burns and eye damage. H318 Causes serious eye damage. H332 Harmful if inhaled. H400 Very toxic to aquatic life. H410 Very toxic to aquatic life with long lasting effects.