

SAFETY DATA SHEET
Bromine Cartridge

According to Appendix D, OSHA Hazard Communication Standard 29 CFR §1910.1200

1. Identification

Product identifier

Product name Bromine Cartridge
Chemical Name Bromochloro-5, 5-dimethylhydantoin
Synonyms; trade names FROG Serene[®] Bromine Cartridge
EPA Registration No. 53735-16

Recommended use of the chemical and restrictions on use

Application For use as a spa and hot tub disinfectant/sanitizer. Not intended for direct application to humans or animals.

Uses advised against Use only for intended applications.

Details of the supplier of the safety data sheet

Supplier King Technology, Inc.
6000 Clearwater Dr
Minnetonka, MN 55343
United States
1+ (952) 933-6118
sdsinfo@kingtechnology.com

Emergency telephone number

Emergency telephone CHEMTREC 800-424-9300 (24 hours)

2. Hazard(s) identification

Classification of the substance or mixture

Physical hazards Ox. Sol. 2 - H272 Combustible Dust - USH01
Health hazards Acute Tox. 4 - H302 Acute Tox. 4 - H332 Skin Corr. 1B - H314 Eye Dam. 1 - H318 Skin Sens. 1 - H317
Environmental hazards Not Classified

Label elements

Hazard symbols



Signal word Danger

Hazard statements H302+H332 Harmful if swallowed or if inhaled.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H272 May intensify fire; oxidizer.
USH01 May form combustible dust concentrations in air.

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Precautionary statements	<p>P210 Keep away from heat, sparks, open flames and hot surfaces. No smoking.</p> <p>P220 Keep away from combustible materials.</p> <p>P221 Take any precaution to avoid mixing with combustibles.</p> <p>P260 Do not breathe dust.</p> <p>P261 Avoid breathing dust.</p> <p>P264 Wash contaminated skin thoroughly after handling.</p> <p>P270 Do not eat, drink or smoke when using this product.</p> <p>P271 Use only outdoors or in a well-ventilated area.</p> <p>P272 Contaminated work clothing must not be allowed out of the workplace.</p> <p>P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.</p> <p>P301+P312 If swallowed: Call a poison center/ doctor if you feel unwell.</p> <p>P301+P330+P331 If swallowed: Rinse mouth. Do NOT induce vomiting.</p> <p>P302+P352 If on skin: Wash with plenty of water.</p> <p>P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.</p> <p>P304+P340 If inhaled: Remove person to fresh air and keep comfortable for breathing.</p> <p>P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p> <p>P310 Immediately call a poison center/ doctor.</p> <p>P321 Specific treatment (see medical advice on this label).</p> <p>P333+P313 If skin irritation or rash occurs: Get medical advice/ attention.</p> <p>P362+P364 Take off contaminated clothing and wash it before reuse.</p> <p>P363 Wash contaminated clothing before reuse.</p> <p>P370+P378 In case of fire: Use foam, carbon dioxide, dry powder or water fog to extinguish.</p> <p>P405 Store locked up.</p> <p>P501 Dispose of contents/ container in accordance with national regulations.</p>
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Contains Bromochloro-5,5-dimethylhydantoin

Other hazards

Other May form combustible dust concentrations in air.

3. Composition/information on ingredients

Mixtures

Bromochloro-5,5-dimethylhydantoin	98%
CAS number: 32718-18-6	
M factor (Acute) = 1	
Classification	
Ox. Sol. 2 - H272	
Combustible dust	
Acute Tox. 4 - H302	
Acute Tox. 4 - H332	
Skin Corr. 1B - H314	
Eye Dam. 1 - H318	
Skin Sens. 1 - H317	

The full text for all hazard statements is displayed in Section 16.

4. First-aid measures

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.

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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.
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.

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. Shortness of breath. Headache. Symptoms following overexposure may include the following: Corrosive to the respiratory tract.
Ingestion	May cause sensitization or allergic reactions in sensitive individuals. May cause chemical burns in mouth, esophagus and stomach. Symptoms following overexposure may include the following: Severe stomach pain. Nausea, vomiting.
Skin contact	May cause skin sensitization or allergic reactions in sensitive individuals. 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.

Indication of immediate medical attention and special treatment needed

Notes for the doctor	Treat symptomatically. May cause sensitization or allergic reactions in sensitive individuals.
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5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media	The product is not flammable. 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.

Special hazards arising from the substance or mixture

Specific hazards	Dust may form explosive mixture with air. May cause or intensify fire; oxidizer. This product is toxic. Severe corrosive hazard. Thermal decomposition or combustion products may include the following substances: Very toxic or corrosive gases or vapors. 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 vapors.

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Advice for firefighters

Protective actions during firefighting

Avoid breathing fire gases or vapors. Evacuate area. Keep upwind to avoid inhalation of gases, vapors, fumes and smoke. Ventilate closed spaces before entering them. May cause or intensify fire; oxidizer. 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. Standard Firefighter's clothing including helmets, protective boots and gloves will provide a basic level of protection for chemical incidents.

6. Accidental release measures

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.

Environmental precautions

Environmental precautions

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

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. Do not use sawdust or other combustible material. 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.

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.

7. Handling and storage

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 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 and wash before reuse. Wash contaminated clothing before reuse.

Conditions for safe storage, including any incompatibilities

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Storage precautions Store away from incompatible materials (see Section 10). Store at temperatures not exceeding 30°C/86°F. Store locked up. Keep away from flammable and combustible materials. Keep only in the original container. Keep container tightly closed, in a cool, well ventilated place. Keep containers upright. Protect containers from damage.

Storage class Oxidizer storage.

Specific end uses(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.

8. Exposure controls/Personal protection

Control parameters

Occupational exposure limits

Manufacturer's recommendation: 0.1 mg/m³ (8-hour TWA)

ACGIH-TLV:
Not determined.

OSHA-PEL:
Not determined.

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 OSHA 1910.138 and be demonstrated to be impervious to the chemical and resist degradation. 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 NIOSH approved. Check that the respirator fits tightly and the filter is changed regularly. Gas and combination filter cartridges should comply with OSHA 1910.134. Full face mask respirators with replaceable filter cartridges should comply with OSHA 1910.134. Half mask and quarter mask respirators with replaceable filter cartridges should comply with OSHA 1910.134.

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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.

9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Tablet. Granules.
Color	White/off-white.
Melting point	Not applicable.
Initial boiling point and range	Not applicable.
Flash point	Not applicable.
Evaporation rate	Not applicable.
Evaporation factor	Not applicable.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	Not applicable.
Vapor pressure	0.00935 Pa @ 25°C/77°F
Vapor density	Not applicable.
Relative density	1.8-2.0
Solubility(ies)	0.22 g/100 g water @ 25°C/77°F 2.5 g/100 g benzene @ 25°C/77°F
Partition coefficient	Kow: < 1
Auto-ignition temperature	No information available.
Decomposition Temperature	160°C/320°F
Viscosity	Not applicable.
Explosive properties	Dust may form explosive mixture with air.
Oxidizing properties	Oxidizer

10. Stability and reactivity

Reactivity	See the other subsections of this section for further details.
Stability	Stable at normal ambient temperatures and when used as recommended. Stable under the prescribed storage conditions.
Possibility of hazardous reactions	May form combustible dust concentrations in air.
Conditions to avoid	Moisture. Keep at temperature not exceeding 160°C/320°F.
Materials to avoid	Reducing agents. Flammable/combustible materials. Hydrocarbons. Organic cyanides (nitriles). Esters. Some metals.

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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 vapors.

11. Toxicological information

Information on toxicological effects

Acute toxicity - oral

Notes (oral LD₅₀) Acute Tox. 4 - H302 Harmful if swallowed.

ATE oral (mg/kg) 947.96

Acute toxicity - dermal

Notes (dermal LD₅₀) Based on available data the classification criteria are not met.

Acute toxicity - inhalation

Notes (inhalation LC₅₀) Acute Tox. 4 - H332 Harmful if inhaled.

ATE inhalation (dusts/mists mg/l) 1.53

Skin corrosion/irritation

Animal data Skin Corr. 1B - H314 Causes severe burns.

Serious eye damage/irritation

Serious eye damage/irritation Eye Dam. 1 - H318 Corrosive to skin. Corrosivity to eyes is assumed.

Respiratory sensitization

Respiratory sensitization Based on available data the classification criteria are not met.

Skin sensitization

Skin sensitization May cause skin sensitization or allergic reactions in sensitive individuals.

Germ cell mutagenicity

Genotoxicity - in vitro Based on available data the classification criteria are not met.

Carcinogenicity

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

IARC carcinogenicity None of the ingredients are listed or exempt.

Reproductive toxicity

Reproductive toxicity - fertility Based on available data the classification criteria are not met.

Reproductive toxicity - development Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure

STOT - single exposure Not classified as a specific target organ toxicant after a single exposure.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure Not classified as a specific target organ toxicant after repeated exposure.

Aspiration hazard

Aspiration hazard Not relevant. Solid.

General information

The severity of the symptoms described will vary dependent on the concentration and the length of exposure.

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Inhalation	Corrosive to the respiratory tract. Symptoms following overexposure may include the following: Severe irritation of nose and throat.
Ingestion	May cause sensitization or allergic reactions in sensitive individuals. May cause chemical burns in mouth, esophagus and stomach. Symptoms following overexposure may include the following: Severe stomach pain. Nausea, vomiting.
Skin Contact	May cause skin sensitization or allergic reactions in sensitive individuals. 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.
Route of exposure	Ingestion Inhalation Skin and/or eye contact
Target Organs	No specific target organs known.
Medical considerations	Skin disorders and allergies.

Toxicological information on ingredients.

Bromochloro-5,5-dimethylhydantoin

Acute toxicity - oral

Acute toxicity oral (LD₅₀
mg/kg) 929.0

Species Rat

ATE oral (mg/kg) 929.0

Acute toxicity - inhalation

ATE inhalation
(dusts/mists mg/l) 1.5

Germ cell mutagenicity

Genotoxicity - in vitro Ames test: Positive.

Gene mutation: Positive.

Genotoxicity - in vivo Micronucleus assay
Negative.

DNA damage and/or repair: Negative.

Carcinogenicity

IARC carcinogenicity Not listed.

NTP carcinogenicity Not listed.

OSHA Carcinogenicity Not listed.

12. Ecological information

Toxicity Aquatic Acute 1 - H400 Very toxic to aquatic life.

Ecological information on ingredients.

Bromochloro-5,5-dimethylhydantoin

Acute aquatic toxicity

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LE(C)₅₀	0.1 < L(E)C50 ≤ 1
M factor (Acute)	1
Acute toxicity - fish	LC ₅₀ , 96 hour: 0.4 mg/l, Oncorhynchus mykiss (Rainbow trout) LC ₅₀ , 96 hour: 0.46 mg/l, Lepomis macrochirus (Bluegill) LC ₅₀ , 96 hour: 1.6 mg/l, Cyprinodon variegatus (Sheepshead minnow)
Acute toxicity - aquatic invertebrates	LC ₅₀ , 48 hour: 0.75 mg/l, Daphnia magna

Persistence and degradability

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

Ecological information on ingredients.

Bromochloro-5,5-dimethylhydantoin

Persistence and degradability	The product is biodegradable.
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Bioaccumulative potential

Bio-Accumulative Potential No data available on bioaccumulation.

Partition coefficient Kow: < 1

Ecological information on ingredients.

Bromochloro-5,5-dimethylhydantoin

Bio-Accumulative Potential The product does not contain any substances expected to be bioaccumulating.

Mobility in soil

Mobility No data available.

Other adverse effects

Other adverse effects None known.

13. Disposal considerations

Waste treatment methods

General information Following dilution, discharge to the sewer with plenty of water may be permitted.

Disposal methods Product or rinsates that cannot be used must be diluted with water before disposal in a sanitary sewer.

Non-refillable container. Do not reuse or refill this cartridge. Offer for recycling if available. Rinse thoroughly before recycling or discarding in trash.

Waste class Dispose of contents/container in accordance with local regulations. Dispose of contents/container in accordance with national regulations.

14. Transport information

General As supplied, this product is consigned under the Limited Quantities provisions.

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15. Regulatory information

Safety, hygiene and environmental regulations / legislation specific for the substance or mixture:

United States FIFRA - Pesticide Labeling

It is a violation of federal law to use this product in a manner inconsistent with its labeling. Read entire label to use strictly in accordance with precautionary statements and directions.

This product is a US EPA FIFRA registered pesticide (EPA Reg. No. 53735-16) and is subject to certain labeling requirements under federal pesticide law. These requirements may differ from the classification criteria and hazard information required for an OSHA GHS SDS. The following is the hazard information as required on the FIFRA label:

Signal Word

DANGER

Hazard Statements

- Corrosive. Causes irreversible eye damage and skin burns
- Harmful if swallowed
- Irritating to nose and throat
- STRONG OXIDIZING AGENT
- This pesticide is toxic to fish and aquatic organisms
- Keep out of reach of children

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities

None of the ingredients are listed or exempt.

CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)

None of the ingredients are listed or exempt.

SARA Extremely Hazardous Substances EPCRA Reportable Quantities

None of the ingredients are listed or exempt.

SARA 313 Emission Reporting

None of the ingredients are listed or exempt.

CAA Accidental Release Prevention

None of the ingredients are listed or exempt.

FDA - Essential Chemical

None of the ingredients are listed or exempt.

FDA - Precursor Chemical

None of the ingredients are listed or exempt.

SARA (311/312) Hazard Categories

Oxidizer (liquid, solid or gas)
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Combustible dust

Bromochloro-5,5-dimethylhydantoin

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OSHA Highly Hazardous Chemicals

None of the ingredients are listed or exempt.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins

None of the ingredients are listed or exempt.

California Air Toxics "Hot Spots" (A-I)

None of the ingredients are listed or exempt.

California Air Toxics "Hot Spots" (A-II)

None of the ingredients are listed or exempt.

California Directors List of Hazardous Substances

None of the ingredients are listed or exempt.

Massachusetts "Right To Know" List

None of the ingredients are listed or exempt.

Rhode Island "Right To Know" List

None of the ingredients are listed or exempt.

Minnesota "Right To Know" List

None of the ingredients are listed or exempt.

New Jersey "Right To Know" List

None of the ingredients are listed or exempt.

Pennsylvania "Right To Know" List

None of the ingredients are listed or exempt.

Inventories

US - TSCA

This product is registered under FIFRA.

BCDMH is listed in the TSCA inventory under CAS 16079-88-2.

TSCA: EPA number P-94-34.

Subject to reporting under SNUR - any use. (40 CFR 721).

US - TSCA 12(b) Export Notification

None of the ingredients are listed or exempt.

16. Other information

Abbreviations and acronyms used in the safety data sheet

CAS: Chemical abstracts service.

ATE: Acute toxicity estimate.

LC₅₀: Lethal concentration to 50 % of a test population.

LD₅₀: Lethal dose to 50% of a test population (median lethal dose). EC₅₀: 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	Ox. Sol. = Oxidising solid Acute Tox. = Acute toxicity Eye Dam. = Serious eye damage Skin Corr. = Skin corrosion Skin Sens. = Skin sensitisation Aquatic Acute = Hazardous to the aquatic environment (acute)
Revision date	10/24/2022
Revision	03
SDS No.	4809
Hazard statements in full	H272 May intensify fire; oxidizer. H302 Harmful if swallowed. H314 Causes severe skin burns and eye damage. H317 May cause an allergic skin reaction. H318 Causes serious eye damage. H332 Harmful if inhaled. USH01 May form combustible dust concentrations in air.
NFPA - health hazard	3
NFPA - flammability hazard	0
NFPA - instability hazard	1
NFPA - special hazard ACA	Oxidizer
HMIS Health rating.	3
ACA HMIS Flammability rating.	0
ACA HMIS Physical hazard rating.	1

The information provided on the SDS is correct to the best of our knowledge, information, and belief at the date of this publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal, and release, and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.