



# Bromine

## General Information

### Key Points

#### **Fire**

- Non flammable
- Vaporises rapidly at room temperature. Reacts violently with reducing agents, metals, ammonia, alcohols and organic materials causing fire and explosion hazard.
- Emits toxic and corrosive fumes when heated to decomposition.
- In the event of a fire involving bromine, use fine water spray and liquid tight fire kit with breathing apparatus

#### **Health**

- Toxic by all routes of exposure
- Very toxic and corrosive
- Inhalation may cause irritation of respiratory tract, cough, chest tightness, headache, lack of coordination, confusion and delayed wheeze and fluid accumulation in the lungs
- Ingestion causes immediate burning of the mouth and throat, drooling, difficulty swallowing, abdominal pain and heart and circulation problems
- Skin exposure may cause burns
- Eye exposure may result in irritation, tearing, pain, involuntary muscle contraction around the eyes and sensitivity to light

#### **Environment**

- Dangerous for the environment
- Inform Environment Agency of substantial incidents

### Background

Bromine is found naturally occurring in the earth's crust and seawater, principally in the form of inorganic bromides. The three major producers of bromine are the United States of America (USA), Israel and the United Kingdom (UK).

Bromine is used in the production of fire retardants, water sanitiser and in agriculture as insecticides. Bromine was used industrially to make compounds such as antiknocking agents for leaded gasoline, but due to environmental considerations this has been phased out. Other uses include fumigants, dyes, agents for photography, bleaching silks and fibres, in brominated vegetable oil, as emulsifiers in soft drinks and in chemical warfare agents.



Exposure to bromine is usually as a result of accidental spills or leaks during transportation or manufacturing. Workers producing or using bromine are the most at risk of exposure to bromine, although safe levels of exposure are enforced to protect workers. Such levels are below those that are thought to cause harmful effects.

Exposure to bromine may occur by breathing it in or by skin or eye contact. If exposed to bromine, the harmful effects largely depend on the way people are exposed. Breathing air with levels of bromine can cause shortness of breath, coughing, choking and wheezing, which may lead to death in severe cases.

Skin exposure to bromine will most likely result in local effects, such as blister formation, skin discolouration and slow healing ulcers. Eye exposure to low and high levels of bromine may produce eye irritation and sensitivity to light, respectively.

Exposure may also occur through ingestion of food contaminated with bromine. Seafood has relatively high levels of bromine. Eating food that has been fumigated with bromine may also be a source of oral exposure to bromine through food. Ingestion of pure bromine is likely to result in burns to the mouth, throat and stomach followed by severe stomach irritation. Prolonged exposure may result in bromine being stored in the body and damage to the brain may be observed if levels reach sufficient levels, possibly resulting in coma.

### Frequently Asked Questions

#### ***What is bromine?***

Bromine is found naturally occurring in the earth's crust and seawater in various chemical forms.

#### ***How does bromine get into the environment?***

Bromine is a naturally occurring element; however its release into the environment is attributed to human use. Bromine enters the environment principally through its use in industry as a fire retardant, in water sanitation, insecticides, and an antiknocking agent for leaded gasoline. Other uses of bromine include fumigants, dyes, agents for photography, bleaching silks and fibres, in brominated vegetable oil and in chemical warfare gas.

#### ***How will I be exposed to bromine?***

People can be exposed to bromine by breathing it in, eating food that has been contaminated with bromine, such as seafood or food that has been fumigated with bromine, or absorption through skin or the eyes. Usually exposure to bromine occurs as a result of accidental spill or leak during transportation or manufacturing.

#### ***If there is bromine in the environment will I have any adverse health effects?***

The presence of bromine in the environment does not always lead to exposure. Clearly, in order for it to cause any adverse health effects you must come into contact with it. You may be exposed by breathing, eating, or drinking the substance or by skin contact. Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Breathing high levels of bromine can damage the lungs, which may lead to death in severe cases. The immediate effects of ingestion of pure liquid bromine are burns to the mouth, throat and stomach. This may be followed by severe stomach irritation. Prolonged exposure results in storage of bromine in the body and when sufficient levels are reached damage to the brain occurs, possibly resulting in coma. Skin exposure is likely to result in blister formation, skin discolouration and long-term exposure may result in slow healing ulcers. Eye exposure to bromine may result in eye irritation and photophobia.

#### ***Can bromine cause cancer?***

There is no evidence to suggest that exposure to bromine would cause cancer in humans.

#### ***Does bromine affect children or damage the unborn child?***

Children will be affected by bromine in the same way as adults. Infants may be exposed to bromine through the placenta.

#### ***What should I do if I am exposed to bromine?***

It is very unlikely that the general population will be exposed to a level of bromine high enough to cause adverse health effects

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