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## Information and recommendations for first responders

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- Before approaching the patient, the first responder must make sure that he does not risk exposing himself to sulfur dioxide.
  - Patients exposed only to sulfur dioxide gas do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with liquid sulfur dioxide (boiling point  $-10^{\circ}\text{C}$ ,  $14^{\circ}\text{F}$ , respectively) can secondarily contaminate rescue and medical personnel by direct contact or through off-gassing sulfur dioxide.
  - Sulfur dioxide gas is rapidly corrosive when it comes in contact with moist tissue such as the eyes, skin, and upper respiratory tract causing eye irritation, coughing, chest pain, dyspnea, and asthmatic symptoms. Swelling of the throat and signs of accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) may occur.
  - There is no antidote to be administered to counteract the effects of sulfur dioxide. Treatment consists of supportive measures.
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### 1. Substance information

Sulfur dioxide (SO<sub>2</sub>), CAS 7446-09-5

Synonyms: sulfurous anhydride

Sulfur dioxide is, at room temperature, a colorless, nonflammable gas with a pungent, irritating, suffocating sulfur odor. Under pressure or at temperatures below  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ ), it is a clear liquid. Sulfur dioxide is soluble in water and forms sulfurous acid (H<sub>2</sub>SO<sub>3</sub>).

Sulfur dioxide is used in ore and metal refining, chemical manufacturing, wood pulp treatment in paper manufacturing, extracting lubricating oils, as a preservative, fumigant, disinfectant, reducing agent, antioxidant in magnesium processing, bleaching agent, fungicide, insecticide, and as a food additive or preservative.

### 2. Routes of exposure

#### *Inhalation*

**Most exposures occur by inhalation.** Sulfur dioxide's odor and irritant properties generally provide adequate warning of hazardous concentrations in normal subjects; however, olfactory fatigue may occur. Asthmatic subjects may respond to concentrations below the odor threshold. Prolonged low-level exposure may result in olfactory fatigue and tolerance of its irritant effects. Sulfur dioxide is heavier than air and may cause asphyxiation in poorly ventilated, low-lying, or enclosed spaces.

#### *Skin/eye contact*

Direct contact with liquid sulfur dioxide or gas on wet or moist skin causes severe chemical burns, leading to cell death and ulceration.

#### *Ingestion*

Ingestion of sulfur dioxide is unlikely because it is a gas at room temperature.

### 3. Acute health effects

**Sulfur dioxide exposure usually causes eye irritation, sore throat, coughing, and asthmatic symptoms.** Rapid development of respiratory distress with chest pain, dyspnea, swelling of the throat, and accumulation of fluid in the lungs may occur. Lung injury may progress over several hours. Sulfur dioxide poisoning may cause respiratory and cardiovascular failure.

If the skin is wet or moist, contact with sulfur dioxide gas can cause burning pain, inflammation, and blisters. Contact with liquid sulfur dioxide under pressure can result in frostbite.

Low gas concentrations cause burning discomfort, spasmodic blinking or involuntary closing of the eyelids, redness, and tearing. Corneal burns occur at high concentrations.

## 4. Actions

### *Rescuer self-protection*

**If the zone which has to be entered by the rescuer is suspected of containing sulfur dioxide, pressure-demand, self-contained breathing apparatus and chemical-protective clothing shall be worn; do not use equipment that is contaminated itself.**

Patients exposed only to sulfur dioxide gas do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with liquid sulfur dioxide may secondarily contaminate rescue and medical personnel by direct contact or through off-gassing sulfur dioxide.

### *Patient recovery*

Patients should be removed from the contaminated zone immediately. Patients who are unable to walk may be removed on backboards or stretchers; if these are not available, carefully remove/transport patients with appropriate action to a safe zone, taking into account your self-protection.

Immediate priorities must follow the "A, B, C's" of resuscitation:

- A) Airway** (make sure the airway is not blocked by the tongue or by a foreign body)
- B) Breathing** (check to see if the patient is breathing, provide ventilation with use of appropriate barrier devices, e.g. with a pocket facemask, if breathing is absent)
- C) Circulation** (start CPR in any unresponsive person with absent or abnormal breathing)

### *Decontamination*

Patients exposed only to sulfur dioxide gas who have no evidence of skin or eye irritation do not need decontamination. All others require decontamination.

Patients who are able and cooperative may assist with their own decontamination. If the exposure involved liquid sulfur dioxide and if clothing is contaminated, remove and double-bag the clothing.

**Irrigate exposed or irritated eyes with plain water or saline for at least 20 minutes.** Remove contact lenses if present and easily removable without additional trauma to the eye. Continue other basic care during flushing.

**Flush exposed skin and hair with plain water for at least 15 minutes.** Protect eyes during flushing of skin and hair. Continue other basic care during flushing.

### *Further actions*

**Each potentially exposed person should seek immediate medical advice and treatment.**

<p>In this document BASF has made a diligent effort to ensure the accuracy and currency of the information presented but makes no claim that the document comprehensively addresses all possible situations related to this topic. This document is intended as an additional resource for first responders in assessing the condition and managing the treatment of patients exposed to sulfur dioxide. It is not, however, a substitute for the judgement of a first responder and must be interpreted in the light of specific information regarding the patient available to such a first responder and in conjunction with other sources of authority.</p>
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