
Information and recommendations for first responders

- **Patients exposed only to dimethyl sulfate vapor do not pose a significant risk of secondary contamination. Patients whose clothing or skin is contaminated with liquid dimethyl sulfate can secondarily contaminate rescue and medical personnel by direct contact or through evaporation of dimethyl sulfate.**
 - **Dimethyl sulfate can produce eye, skin, and respiratory tract irritation. Signs of accumulation of fluid in the lungs (shortness of breath, cyanosis, expectoration, cough) may evolve 12 hours or more after exposure. Skin reactions may be delayed and may heal very slowly.**
 - **Inhalation and skin contact may result in systemic absorption resulting in headache, nausea, vomiting, abdominal pain, lung, liver, and kidney damage.**
 - **There is no antidote to be administered to counteract the effects of dimethyl sulfate. Treatment consists of supportive measures.**
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1. Substance information

Dimethyl sulfate (CH₃)₂SO₄, CAS 77-78-1

Synonyms: DMS, sulfuric acid dimethyl ester.

Dimethyl sulfate is a color- and odorless (to faint onion odor) oily liquid with a melting point of about -32°C and a boiling point of 188 (-25,6°F, 370 °F respectively). It is not flammable and not explosive, the flash point is 83 °C 181 °F) and the vapor pressure is low with 65 Pa at 20 °C (68 °F). It is slightly soluble in water; soluble in alcohols, ether, and aromatic hydrocarbons. It rapidly hydrolyzes in the presence of water to produce sulfuric acid and methanol.

Dimethyl sulfate is mainly used as a chemical intermediate. Its major applications are as a methylating agent of many organic chemicals (e.g. amines, carbon acids, thiols and phenols) both in industry and in laboratories. DMS is used, for example, in the manufacturing of dyes, perfumes, pharmaceuticals, for the separation of mineral oils and for the analysis of automobile fluids. The substance has also sulphating properties.

2. Routes of exposure

Inhalation

Inhalation is a major route of dimethyl sulfate exposure. Dimethyl sulfate is odorless (to faint onion odor) and is considered to have poor warning properties of hazardous exposure.

Skin/eye contact

Dimethyl sulfate vapor or liquids may be absorbed through the skin and eyes; however, direct contact with dimethyl sulfate vapor or concentrated solutions may cause severe chemical burns.

Ingestion

Involuntary ingestion of dimethyl sulfate is unlikely.

3. Acute health effects

Dimethyl sulfate exposure may produce local irritation of the nose, throat, and lungs. At high doses, it may cause accumulation of fluid in the lungs up to 12 hours or more after exposure resulting in shortness of breath, cyanosis, expectoration, and cough.

Skin contact with dimethyl sulfate vapor or liquid may cause irritation with redness of the skin, blistering, itching, and pain. **Skin reactions may have a 1 to 2 hours delay before onset of symptoms, and the full effects may be delayed up to 12 hours or more after exposure and may heal very slowly.** High vapor concentrations or splashes of concentrated solutions can cause tearing and redness of the eye, and corneal injury.

Both inhalation and skin contact may lead to systemic absorption causing severe headache, nausea, vomiting, abdominal pain, and lung, liver and kidney injury.

4. Actions

Rescuer self-protection

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

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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 ventilations with use of appropriate barrier devices, e.g. with a pocket face mask, if breathing is absent)
- C) Circulation** (start CPR in any unresponsive person with absent or abnormal breathing)

Decontamination

All patients exposed to dimethyl sulfate liquid or vapor, even in the absence of skin or eye irritation, need decontamination.

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

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.

Irrigate exposed or irritated eyes with plain water or saline for at least 15 minutes. Remove contact lenses if present and easily removable without additional trauma to the eye. Continue other basic care during flushing.

Further actions

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

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 Dimethyl sulfate. 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.

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