

---

## Information and recommendations for first responders

---

- Patients whose clothing or skin is contaminated with these acid anhydrides or their dusts can cause secondary contamination of rescue and medical personnel by direct contact.
  - Acid anhydrides and their dusts and vapors are irritating when they come in contact with the eyes, skin, and upper respiratory tract causing coughing, sore throat and wheezing. Obstruction of the airways and respiratory distress with chest pain and dyspnea may occur. Skin and pulmonary allergy is possible.
  - Ingestion of acid anhydrides can cause irritation to the lips, mouth, throat, esophagus, and stomach.
  - Immediate decontamination (first removal of solid acid anhydrides, thereafter flushing of contaminated eyes, skin, and hair) is crucial.
  - There is no antidote to be administered to counteract the effects of acid anhydrides. Treatment consists of supportive measures.
- 

### 1. Substance information

Maleic anhydride (C<sub>4</sub>H<sub>2</sub>O<sub>3</sub>), CAS 108-31-6

Synonyms: 2,5-furandione, maleic acid anhydride.

At room temperature maleic anhydride is a white crystalline solid with an acrid odor. Maleic anhydride is soluble in water, acetone, ethyl acetate, chloroform, and benzene. Vapor pressure is 25 Pa at 25°C. In presence of water maleic anhydride hydrolyzes to maleic acid.

Use of maleic anhydride includes the manufacture of polyester and alkyd coating resins, fumaric and tartaric acids and maleic hydrazide, a herbicide.

Phthalic anhydride (C<sub>8</sub>H<sub>4</sub>O<sub>3</sub>), CAS 85-44-9

Synonyms: 1,2-benzenedicarboxylic anhydride, phthalic acid anhydride.

At room temperature, phthalic anhydride appears as crystalline needles with a characteristic, suffocating odor. Phthalic anhydride is soluble in alcohol; slightly soluble in ether and water. Vapor pressure is < 0.3 Pa at 20°C. In presence of water phthalic anhydride hydrolyzes to phthalic acid.

Phthalic anhydride is widely used in organic syntheses for the manufacture of many resins, polyesters, dyes, pharmaceuticals, plasticizers, and fungicides.

### 2. Routes of exposure

#### *Inhalation*

**Inhalation of dust and vapor is a relevant route of exposure.** Acid anhydrides' irritant properties do not generally provide adequate warning of acutely hazardous concentrations. Allergic individuals may react to very low concentrations of acid anhydrides.

#### *Skin/eye contact*

**Most exposures to acid anhydrides occur by skin contact.** Direct contact with solid acid anhydrides or dusts on eyes or skin causes irritation.

#### *Ingestion*

Ingestion of acid anhydrides can cause irritation to the lips, mouth, throat, esophagus, and stomach.

### 3. Acute health effects

#### *Respiratory*

**Acid anhydrides exposure usually causes coughing, sore throat and wheezing.** Inhalation may result in obstruction of the airways and respiratory distress with chest pain and dyspnea. Several cases of occupational asthma have been reported.

#### *Skin contact*

Irritation, redness and pain of the skin and mucous membranes may be caused by contact with acid anhydrides. Skin sensitization with occasional urticaria and eczematous response may occur.

#### *Eye contact*

Eye irritation with burning discomfort, spasmodic blinking or involuntary closing of the eyelids, redness, and tearing may be caused by contact with acid anhydrides.

### 4. Actions

#### *Rescuer self-protection*

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

Patients whose clothing or skin is contaminated with acid anhydrides can cause secondary contamination of rescue and medical personnel by direct contact.

#### *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 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 face mask, if breathing is absent)
- C) Circulation** (start CPR in any unresponsive person with absent or abnormal breathing)

#### *Decontamination*

Patients exposed only to acid anhydride vapors 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 acid anhydrides and if clothing is contaminated, remove and double-bag the clothing.

**If any solid acid anhydrides or dusts are present on the patient's skin, hair or clothes, brush it away before flushing. Protect yourself and the patient's eyes.**

**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.

**Then, 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*

In case of ingestion of acid anhydrides do not induce emesis. Each potentially exposed person should seek 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 acid anhydrides. 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.

**BASF SE**  
Corporate Health Management  
Carl-Bosch-Straße 38  
67056 Ludwigshafen  
Germany

**BASF Corporation**  
Medical Department  
100 Campus Drive, M/S F 221  
Florham Park, NJ 07932  
USA