DIMETHYL SULFATE

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CAS No: 77-78-1
RTECS No: WS8225000
UN No: 1595
EC No: 016-023-00-4

Sulfuric acid dimethyl ester
Dimethyl monosulfate
DMS
$C_2H_6O_4S$ / $(CH_3O)_2SO_2$
Molecular mass: 126.13

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/SYMPTOMS	PREVENTION	FIRST AID/FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION	Above 83/C explosive vapour/air mixtures may be formed.	Above 83/C use a closed system, ventilation.	
EXPOSURE		**AVOID ALL CONTACT!**	**IN ALL CASES CONSULT A DOCTOR!**
Inhalation	Burning sensation. Cough. Headache. Shortness of breath. Sore throat. Symptoms may be delayed (see Notes).	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.
Skin	MAY BE ABSORBED! Skin burns. Pain. Blisters.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
Eyes	Redness. Pain. Blurred vision. Severe deep burns.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
Ingestion	Abdominal cramps. Burning sensation. Convulsions. Diarrhoea. Shock or collapse. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention immediately.

SPILLAGE DISPOSAL	PACKAGING & LABELLING	
Evacuate danger area! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in dry sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: complete protective clothing including self-contained breathing apparatus.	T+ Symbol R: 45-25-26-34-43-68 S: 53-45 Note: E UN Hazard Class: 6.1 UN Subsidiary Risks: 8 UN Pack Group: I	Airtight. Special material. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs.

EMERGENCY RESPONSE	SAFE STORAGE
Transport Emergency Card: TEC (R)-61S1595 or 61GTC1-I NFPA Code: H4; F2; R0	Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Cool. Dry. Well closed. Ventilation along the floor.

IPCS
International Programme on Chemical Safety

Prepared in the context of cooperation between the International Programme on Chemical Safety and the European Commission

IMPORTANT DATA

Physical State; Appearance
COLOURLESS, OILY LIQUID.

Physical dangers
The vapour is heavier than air.

Chemical dangers
The substance decomposes on heating or on burning producing toxic fumes including sulfur oxides. The solution in water is a medium strong acid. Reacts with water to produce sulfuric acid with evolution of heat. Reacts violently with concentrated aqueous ammonia, bases, acids and strong oxidants with risk of fire and explosion.

Occupational exposure limits
TLV: 0.1 ppm as TWA; (skin); A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004).
MAK: skin absorption (H); Carcinogen category: 2; (DFG 2004).

Routes of exposure
The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion.

Inhalation risk
Evaporation at 20/C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

Effects of short-term exposure
The substance is corrosive to the eyes, the skin, the respiratory tract. Corrosive on ingestion. Inhalation of the vapour may cause lung oedema (see Notes). Ingestion of the substance may cause oedema of lips, tongue and pharynx. The substance may cause effects on the liver, kidneys and central nervous system, resulting in impaired functions. Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.

Effects of long-term or repeated exposure
Lungs may be affected by repeated or prolonged exposure to the vapour. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point (decomposes): 188/C
Melting point: -32/C
Relative density (water = 1): 1.33
Solubility in water: hydrolysis above 18/C
Vapour pressure, Pa at 20/C: 65
Relative vapour density (air = 1): 4.35
Flash point: 83/C
Auto-ignition temperature: 470/C
Explosive limits, vol% in air: 3.6-23.3

ENVIRONMENTAL DATA

The substance is toxic to aquatic organisms.

NOTES

The onset of symptoms can occur after a relatively asymptomatic latent period of 6-24 hours.
Commercial dimethyl sulfate may contain trace amounts of sulfuric acid.
Depending on the degree of exposure, periodic medical examination is suggested.
The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.
Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered.
No odour warning if toxic concentrations are present.
Do NOT take working clothes home.
NEVER pour water into this substance; when dissolving or diluting always add it slowly to the water.
Card has been partly updated in October 2005. See sections Occupational Exposure Limits, EU classification, Emergency Response.

ADDITIONAL INFORMATION