Chemical Safety Data Sheet MSDS / SDS

Dimethyl sulphate SDS

Revision Date:2024-04-25 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name: Dimethyl sulphate

CAS: 77-78-1

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.

Uses advised against: none

Company Identification

Company: Chemicalbook.in

Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090

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SECTION 2: Hazards identification

Classification of the substance or mixture

Acute toxicity - Category 3, Oral
Skin corrosion, Sub-category 1B

Skin sensitization, Category 1
Acute toxicity - Category 2, Inhalation
Germ cell mutagenicity, Category 2
Carcinogenicity, Category 1B

GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H301 Toxic if swallowed
H314 Causes severe skin burns and eye damage
H317 May cause an allergic skin reaction
H330 Fatal if inhaled
H341 Suspected of causing genetic defects
H350 May cause cancer

Precautionary statement(s)

Prevention

P264 Wash ... thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.
P203 Obtain, read and follow all safety instructions before use.

Response

P301+P316 IF SWALLOWED: Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P363 Wash contaminated clothing before reuse.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P316 Get emergency medical help immediately.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P302+P352 IF ON SKIN: Wash with plenty of water/...
P333+P317 If skin irritation or rash occurs: Get medical help.
P362+P364 Take off contaminated clothing and wash it before reuse.
P320 Specific treatment is urgent (see ... on this label).
P318 IF exposed or concerned, get medical advice.

Storage

P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

Substance

Chemical name:	Dimethyl sulphate
Common names and synonyms:	Dimethyl sulphate
CAS number:	77-78-1
EC number:	201-058-1
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer immediately for medical attention.

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer immediately for medical attention.

Following eye contact

Rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.

Following ingestion

Rinse mouth. Give one or two glasses of water to drink. Do NOT induce vomiting. Refer immediately for medical attention.

Most important symptoms/effects, acute and delayed

Acute: extremely toxic vapors and liquid -- a few whiffs or contact on skin could be fatal. Also acutely toxic if ingested. Delayed effects which are ultimately fatal may also occur. Lethal concentrations as low as 97 ppm/10 min have been reported in humans. DNA inhibition and damage to human somatic cells, and sister chromatid exchange in human fibroblast cells were observed. Delayed appearance of symptoms may permit unnoticed exposure to lethal quantities. (EPA, 1998)

Indication of immediate medical attention and special treatment needed, if necessary

IN ALL CASES CONSULT A DOCTOR! INHALATION: Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention. SKIN: Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. EYES: First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. INGESTION: Rinse mouth. Give plenty of water to drink. Refer for medical attention immediately.

SECTION 5: Firefighting measures

Suitable extinguishing media

Water, foam, carbon dioxide, dry chemical .

Specific hazards arising from the chemical

Material is normally stable even under fire exposure conditions and is not hazardously reactive with water. It is incompatible with strong oxidizers and strong ammonia solutions. (EPA, 1998)

Special protective actions for fire-fighters

Use powder, foam, carbon dioxide, water spray.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in dry sand or inert absorbent. Then store and dispose of according to local regulations.

Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in dry sand or inert absorbent. Then store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

Spillage should only be dealt with by trained personnel wearing full protective clothing, a full-face mask, and positive-pressure breathing apparatus. Soda ash or 3% ammonia solution may be applied to liquid spills. Sprays of 3% ammonia solution may be used to "knock down" the vapor over spillages. After complete neutralization, spillages may be washed away... If dimethyl sulfate has entered a watercourse ... or contaminated soil or vegetation, advise the police and public authorities.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames. Above 83°C use a closed system and ventilation. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Separated from food and feedstuffs and incompatible materials. See Chemical Dangers. Cool. Dry. Well closed. Ventilation along the floor. Store in an area without drain or sewer access.PRECAUTIONS FOR "CARCINOGENS": Storage site should be as close as practicable to lab in which carcinogens are to be used, so that only small quantities required for ... expt need to be carried. Carcinogens should be kept in only one section of cupboard, an explosion-proof refrigerator, or freezer (depending on

chemicophysical properties ...) that bears appropriate label. An inventory ... should be kept, showing quantity of carcinogen & date it was acquired . Facilities for dispensing ... should be contiguous to storage area. Chemical Carcinogens

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 0.1 ppm as TWA; (skin); A3 (confirmed animal carcinogen with unknown relevance to humans).MAK: skin absorption (H); carcinogen category: 2

Biological limit values

no data available

Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state:	Dimethyl sulfate is a colorless oily liquid, odorless to a faint onion-like odor. It is very toxic by inhalation. It is a combustible liquid and has a flash point of 182°F. It is slightly soluble in water and decomposed by water to give sulfuric acid with evolution of heat. It is corrosive to metals and tissue. It is a potent methylating agent.
Colour:	Colorless oily liquid
Odour:	Essentially odorless
Melting point/freezing point:	63°C(lit.)
Boiling point or initial boiling point and boiling range:	188°C(lit.)
Flammability:	Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.
Lower and upper explosion limit/flammability limit:	no data available
Flash point:	83°C
Auto-ignition temperature:	923°F
Decomposition temperature:	188°C
pH:	no data available
Kinematic viscosity:	no data available
Solubility:	3 % at 64° F (NIOSH, 2016)
Partition coefficient n-octanol/water:	log Kow = 0.16 (est)
Vapour pressure:	0.1 to 0.5 mm Hg at 68° F (EPA, 1998)
Density and/or relative density:	1.333g/mLat 25°C(lit.)

Relative vapour density:	4.3 (vs air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

NIOSH considers dimethyl sulfate to be a potential occupational carcinogen.
Decomposes on heating and on burning. This produces toxic fumes including sulfur oxides. The solution is a medium strong acid. Reacts with water. This produces sulfuric acid. This generates heat. Reacts violently with concentrated aqueous ammonia, bases, acids and strong oxidants. This generates fire and explosion hazard.

Chemical stability

Stable at room temperature.

Possibility of hazardous reactions

MODERATE, WHEN EXPOSED TO HEAT OR FLAME.Pure DIMETHYL SULFATE and concentrated aqueous ammonia react extremely violently with one another, as is the case for tertiary organic bases, [NFPA 491M, 1991]. Dimethyl sulfate ignites in contact with unheated barium chlorite, due to the rapid formation of unstable methyl chlorite. The product of methylating an unnamed material at 110° C was allowed to remain in a reactor for 80 min. before the reactor exploded. This involved a sulfur ester such as dimethyl sulfate, [MCA Case History No. 1786].

Conditions to avoid

no data available

Incompatible materials

Can react with oxidizing materials.

Hazardous decomposition products

Note: Decomposes in water to sulfuric acid; corrosive to metals.

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 Mouse oral 140 mg/kg bw

Inhalation: LC50 Guinea pig inhalation 167 mg/cu m (32 ppm)/60 min.

Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Evaluation: There is inadequate evidence for the carcinogenicity in humans of dimethyl sulfate. There is sufficient evidence for the carcinogenicity in experimental animals of dimethyl sulfate. Overall evaluation: Dimethyl sulfate is probably carcinogenic to humans (Group 2A). In making the overall evaluation, the Working Group took into consideration that dimethyl sulfate is a potent genotoxic chemical which can directly alkylate DNA both in vitro and in vivo.

Reproductive toxicity

No information is available on the reproductive or developmental effects of dimethyl sulfate in humans. Dimethyl sulfate has been reported to produce tumors in the offspring of rats exposed intravenously.

STOT-single exposure

The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation may cause lung oedema. See Notes. The substance may cause effects on the liver and kidneys kidneys. This may result in impaired functions. Exposure far above

the OEL could cause death. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

Repeated or prolonged inhalation of the vapour may cause effects on the lungs. This substance is probably carcinogenic to humans. Repeated or prolonged contact may cause skin sensitization.

Aspiration hazard

A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50; Species: Lepomis macrochirus (Bluegill, length 33-75 mm); Conditions: freshwater, static, 23 deg C, pH 7.6-7.9, hardness 55 mg/L CaCO3; Concentration: 7500 ug/L for 96 hr /99% purity

Toxicity to daphnia and other aquatic invertebrates: no data available

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

Persistence and degradability

no data available

Bioaccumulative potential

Based upon the hydrolysis of dimethyl sulfate in aqueous environments(1), bioconcentration is not expected to be a primary removal process in aquatic systems(SRC).

Mobility in soil

Based upon the hydrolysis of dimethyl sulfate in aqueous environments(1), adsorption to soil and leaching are not expected to be important processes(SRC).

Other adverse effects

no data available

SECTION 13: Disposal considerations

Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

UN Number

ADR/RID: UN1595 (For reference only, please check.)
IMDG: UN1595 (For reference only, please check.)
IATA: UN1595 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: DIMETHYL SULPHATE (For reference only, please check.)
IMDG: DIMETHYL SULPHATE (For reference only, please check.)
IATA: DIMETHYL SULPHATE (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.)
IMDG: 6.1 (For reference only, please check.)
IATA: 6.1 (For reference only, please check.)

Packing group, if applicable

ADR/RID: I (For reference only, please check.)
IMDG: I (For reference only, please check.)
IATA: I (For reference only, please check.)

Environmental hazards

ADR/RID: No
IMDG: No
IATA: No

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

European Inventory of Existing Commercial Chemical Substances (EINECS)

Listed.

EC Inventory

Listed.

United States Toxic Substances Control Act (TSCA) Inventory

Listed.

China Catalog of Hazardous chemicals 2015

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Listed.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

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 by an authorized person, should be considered.There is no odour warning even when toxic concentrations are present.Do NOT take working clothes home.