

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.2
Creation Date: July 15, 2019
Revision Date: August 08, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Dimethyl Sulfate

1.2 Other means of identification

Product number C4X-25581

Other names Sulfuric acid, dimethyl ester; dimethyl sulphate; Methylsulphate

1.3 Recommended use of the chemical and restrictions on use

Identified uses For laboratory and Industrial use only.

Uses advised against no data available

1.4 Supplier's details

Company CATO Research Chemicals Inc.

Address 3/F,Building B,No.179 BASIGO, Guangpu Rd East,Huangpu Dist,Guangzhou

Telephone +86-20-81960175

1.5 Emergency phone number

Emergency phone number +86-20-81960175

Service hours 'Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

SECTION 2: Hazard identification

2.1 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

2.2 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.

2.3 Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

3.1 Substances

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

SECTION 4: First-aid measures

4.1 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.

4.2 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)

4.3 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: Fire-fighting measures

5.1 Suitable extinguishing media

Water, foam, carbon dioxide, dry chemical .

5.2 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)

5.3 Special protective actions for fire-fighters

Use powder, foam, carbon dioxide, water spray.

SECTION 6: Accidental release measures

6.1 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.

6.2 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.

6.3 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

7.1 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.

7.2 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 chemico-physical 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

8.1 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

8.2 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.

8.3 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/mL at 25°C(lit.)
Relative vapour density	4.3 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 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.

10.2 Chemical stability

Stable at room temperature.

10.3 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].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Can react with oxidizing materials.

10.6 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. 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

12.1 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

12.2 Persistence and degradability

no data available

12.3 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).

12.4 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).

12.5 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 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

14.1 UN Number

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

14.2 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.)

14.3 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.)

14.4 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.)

14.5 Environmental hazards

ADR/RID: No IMDG: No IATA: No

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

Chemical name	Common names and synonyms	CAS number	EC number
Dimethyl sulphate	Dimethyl sulphate	77-78-1	201-058-1
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.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.
Korea Existing Chemicals List (KECL)			Listed.

SECTION 16: Other information

Information on revision

Creation Date July 15, 2019
Revision Date August 08, 2025

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.

Any questions regarding this SDS, Please send your inquiry to info@cato-chem.com

Disclaimer: The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. We as supplier shall not be held liable for any damage resulting from handling or from contact with the above product.