ChemicalBook

Chemical Safety Data Sheet MSDS / SDS

Dimethyl phosphite

Revision Date:2025-06-14 Revision Number:1

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

Product identifier

Product name	: Dimethyl phosphite
CBnumber	: CB9248221
CAS	: 868-85-9
EINECS Number	: 212-783-8
Synonyms	: dimethyl phosphite,dimethyl phosphonate

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
Address	: Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing
Telephone	: 010-86108875

SECTION 2: Hazards identification

Classification of the substance or mixture

Skin sensitization, Category 1

Germ cell mutagenicity, Category 2

Carcinogenicity, Category 2

Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 3

Label elements

Pictogram(s)

Signal word Warning

Hazard statement(s)

H227 Combustible liquid

H303 May be harmfulif swallowed

H311 Toxic in contact with skin

H315 Causes skin irritation

H317 May cause an allergic skin reaction

H319 Causes serious eye irritation

H335 May cause respiratory irritation

H341 Suspected of causing genetic defects

H351 Suspected of causing cancer

H412 Harmful to aquatic life with long lasting effects

Precautionary statement(s)

P201 Obtain special instructions before use.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continuerinsing.

P405 Store locked up.

Prevention

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P272 Contaminated work clothing should not be allowed out of the workplace.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

P203 Obtain, read and follow all safety instructions before use.

P273 Avoid release to the environment.

Response

P302+P352 IF ON SKIN: Wash with plenty of water/...

P333+P317 If skin irritation or rash occurs: Get medical help.

P321 Specific treatment (see ... on this label).

P362+P364 Take off contaminated clothing and wash it before reuse.

P318 IF exposed or concerned, get medical advice.

Storage

P405 Store locked up.

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

no data available

SECTION 3: Composition/information on ingredients

Substance

Product name	: Dimethyl phosphite
Synonyms	: dimethyl phosphite,dimethyl phosphonate
CAS	: 868-85-9
EC number	: 212-783-8
MF	: C2H7O3P

MW : 110.05

SECTION 4: First aid measures

Description of first aid measures

If inhaled

Fresh air, rest. Refer for medical attention.

Following skin contact

First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again.

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Refer for medical attention .

Most important symptoms and effects, both acute and delayed

no data available

Indication of any immediate medical attention and special treatment needed

Absorption, Distribution and Excretion

A study of dimethyl hydrogen phosphite (DMHP) by the National Toxicology Program (NTP) indicated that chronic administration by oral gavage resulted in an increased incidence of neoplastic lesions in the lungs and forestomachs of Fischer 344 rats but not in B6C3F1 mice. The current study was designed to evaluate the metabolic basis, if any, of this species selectivity by studying the metabolism and disposition of carbon-14-DMHP in the respective strains of rats and mice. Results of this study indicate that DMHP administered at a range of dose of 10-200 mg/kg was readily and near completely absorbed from the gastrointestinal tracts of rats and mice. DMHP-derived radioactivity was eliminated primarily as CO2 in the expired air, 44-57%, and urine, 28-49%, and very little was collected in feces, 1-2%, or as volatile organics, 2-3%. DMHP-derived radioactivity was widely distributed in tissues of rats and mice, with the highest concentrations observed in the liver, kidneys, spleen, lungs, and forestomach, and the lowest in brain, skeletal muscle, and adipose tissue. The disappearance of radioactivity from mouse tissues was approximately twice as rapid as from rat tissues. In vitro, DMHP was metabolized to formaldehyde by the microsomal fractions of liver, lungs, kidneys, forestomach, and glandular stomach. In vivo, DMHP was metabolized to the product of demethylation, monomethyl hydrogen phosphite (MMHP), which was excreted in urine. Results of this study indicate that the NTP carcinogenicity study with DMHP was carried out within the dose range in which the absorption, metabolism, and disposition of DMHP are linear in both species. Apparent species-dependent differences in the metabolism and disposition of DMHP are limited to the more rapid metabolism and elimination by the mouse. Therefore, the species-dependent variations in the carcinogenicity of DMHP are most likely attributable to factors other than metabolism and disposition.

SECTION 5: Firefighting measures

Extinguishing media

Use foam, alcohol-resistant foam, carbon dioxide.

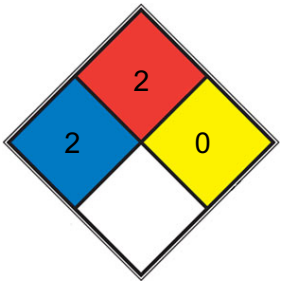
Specific Hazards Arising from the Chemical

Combustible. Above 70°C explosive vapour/air mixtures may be formed.

Advice for firefighters

Use foam, alcohol-resistant foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water. NO direct contact with water. Combat fire from a sheltered position.

NFPA 704



■	HEALTH	2	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. diethyl ether, ammonium phosphate, iodine)
■	FIRE	2	Must be moderately heated or exposed to relatively high ambient temperature before ignition can occur and multiple finely divided suspended solids that do not require heating before ignition can occur. Flash point between 37.8 and 93.3 °C (100 and 200 °F). (e.g. diesel fuel, sulfur)
■	REACT	0	Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium,N2)
□	SPEC. HAZ.		

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal protection: chemical protection suit and filter respirator for acid gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Cover the spilled material with inert absorbent. Collect leaking and spilled liquid in sealable containers as far as possible.

Environmental precautions

Personal protection: chemical protection suit and filter respirator for acid gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Cover the spilled material with inert absorbent. Collect leaking and spilled liquid in sealable containers as far as possible.

Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. Above 70°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

Dry. Store in an area without drain or sewer access. Separated from food and feedstuffs. See Chemical Dangers.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

MAK: carcinogen category: 3B

Biological limit values

no data available

Exposure 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

Eye/face protection

Wear safety goggles.

Skin protection

Protective clothing. Protective gloves.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

Physical state	Colorless liquid with a mild odor
Colour	Mobile, colorless liquid
Odour	Mild odor
Melting point/freezing point	29 deg C
Boiling point or initial boiling point and boiling range	170-171°C
Flammability	Combustible.
Lower and upper explosion limit/flammability limit	no data available
Flash point	85

Auto-ignition temperature	237°C
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	1.06 centistokes at 25 deg C
Solubility	Soluble in water; miscible with most organic solvents
Partition coefficient n-octanol/water	-1.2
Vapour pressure	1.5 mm Hg at 20 deg C
Density and/or relative density	1.2
Relative vapour density	7.9 (Air = 1)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

Reactivity

Decomposes rapidly on heating. This produces toxic fumes including phosphorus oxides and phosphine. Decomposes on contact with moist air above 220°C. This produces phosphoric acid and methanol. The solution in water is a strong acid. It reacts violently with bases and is corrosive. Reacts violently with acids and oxidants.

Chemical stability

no data available

Possibility of hazardous reactions

The vapour is heavier than air.

Conditions to avoid

no data available

Incompatible materials

no data available

Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /phosphorous oxides/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Mouse (male) oral 2815 mg/kg bw
- Inhalation: no data available
- 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: No epidemiological data relevant to the carcinogenicity of dimethyl hydrogen phosphite were available. There is limited evidence for the carcinogenicity of dimethyl hydrogen phosphite in experimental animals. Overall evaluation: Dimethyl hydrogen phosphite is not classifiable as to its carcinogenicity to humans (Group 3).

Reproductive toxicity

no data available

STOT-single exposure

The substance is irritating to the eyes and skin.

STOT-repeated exposure

The substance may have effects on the eyes. This may result in cataract.

Aspiration hazard

A harmful contamination of the air will be reached slowly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50; Species: Pimephales promelas (Fathead minnow); Conditions: freshwater; static; Concentration: 225000 ug/L for 4 days/formulated product

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

AEROBIC: Dimethyl hydrogen phosphite, present at 100 mg/L, reached 48% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L and the Japanese MITI test(1). However, biodegradation is not expected to be an important fate process(SRC) due to the hydrolysis of dimethyl hydrogen phosphite(2-5).

Bioaccumulative potential

Bioconcentration is not expected to be an important fate process(SRC) due to the rapid hydrolysis of dimethyl hydrogen phosphite(1-4).

Mobility in soil

Adsorption to soils or suspended solids is not expected to be an important fate process(SRC) due to the hydrolysis of dimethyl hydrogen phosphite(1-4).

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: Not dangerous goods. (For reference only, please check.)

IMDG: Not dangerous goods. (For reference only, please check.)

IATA: Not dangerous goods. (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: Not dangerous goods. (For reference only, please check.)

IMDG: Not dangerous goods. (For reference only, please check.)

IATA: Not dangerous goods. (For reference only, please check.)

Transport hazard class(es)

ADR/RID: Not dangerous goods. (For reference only, please check.)

IMDG: Not dangerous goods. (For reference only, please check.)

IATA: Not dangerous goods. (For reference only, please check.)

Packing group, if applicable

ADR/RID: Not dangerous goods. (For reference only, please check.)

IMDG: Not dangerous goods. (For reference only, please check.)

IATA: Not dangerous goods. (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

Not 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

Do NOT use in the vicinity of a fire or a hot surface, or during welding.