Chemical Safety Data Sheet MSDS / SDS

N,N-dimethylhydrazine 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: N,N-dimethylhydrazine

CAS: 57-14-7

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

Telephone: +91 9550333722

SECTION 2: Hazards identification

Classification of the substance or mixture

Flammable liquids, Category 2
Acute toxicity - Category 3, Oral

Skin corrosion, Sub-category 1B
Acute toxicity - Category 3, Inhalation
Carcinogenicity, Category 1B
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 2

GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour
H301 Toxic if swallowed
H314 Causes severe skin burns and eye damage
H331 Toxic if inhaled
H350 May cause cancer
H411 Toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof [electrical/ventilating/lighting/...] equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
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.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P203 Obtain, read and follow all safety instructions before use.
P273 Avoid release to the environment.

Response

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower].
P370+P378 In case of fire: Use ... to extinguish.
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.
P318 IF exposed or concerned, get medical advice.
P391 Collect spillage.

Storage

P403+P235 Store in a well-ventilated place. Keep cool.
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:	N,N-dimethylhydrazine
Common names and synonyms:	N,N-dimethylhydrazine
CAS number:	57-14-7
EC number:	200-316-0
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Refer immediately for medical attention.

Following skin contact

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

Following eye contact

Rinse with plenty of water (remove contact lenses if easily possible).

Following ingestion

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

Most important symptoms/effects, acute and delayed

This compound exhibits high acute toxicity as a result of exposure by all routes. Death or permanent injury may result after very short exposure to small quantities. Chronic exposure may cause pneumonia, liver damage, and kidney damage. (EPA, 1998)

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

Specific treatment for exposure consists of thorough washing of all exposed skin areas with soap and water, copious irrigation of the eyes, and prompt removal of the patient from the source of exposure. Hydrazines

SECTION 5: Firefighting measures

Suitable extinguishing media

If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped or safely confined. Use water in flooding quantities as fog. Solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use "alcohol" foam, dry chemical or carbon dioxide.

Specific hazards arising from the chemical

Vapor may explode if ignited in an enclosed area. Vapors may travel to a source of ignition and flashback. Runoff to sewer may create fire or explosion hazard. When it decomposes, 1,1-dimethylhydrazine gives off toxic nitrogen compound fumes. Dissolves, swells, and disintegrates many plastics. Dangerous when exposed to heat, flame, or oxidizers. Hazardous polymerization may not occur. (EPA, 1998)

Special protective actions for fire-fighters

Use powder, alcohol-resistant foam, water in large amounts, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable non-plastic containers. Do NOT absorb in saw-dust or other combustible absorbents. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Environmental precautions

Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable non-plastic containers. Do NOT absorb in saw-dust or other combustible absorbents. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

Activated carbon, polyurethane foam and polypropylene fibers are the most advantageous agents for cleanup of 1,1-dimethylhydrazine. Also Amberlite XAD resins and Dowex 50WX8 or Amberlite IRA 900 may be used.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. NO contact with oxidizing agents or acids. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools. 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

Fireproof. Provision to contain effluent from fire extinguishing. Separated from strong oxidants and strong acids. Dry. Well closed. Keep in a well-ventilated room. Do NOT store or transport in containers made from plastic. 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: 0.01 ppm as TWA; (skin); A3 (confirmed animal carcinogen with unknown relevance to humans).MAK: skin absorption (H); sensitization of skin (SH); 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:	1,1-dimethylhydrazine is a clear colorless liquid with an ammonia-like odor. Flash point 0°F. Corrosive to the skin. Less dense than water and soluble in water. Vapors are heavier than air and very toxic by inhalation, attacking the eyes and respiratory system. Prolonged exposure of containers to heat may result in their violent rupturing and rocketing due to decomposition. Generates toxic oxides of nitrogen when burned. Vapors may travel to a source of ignition and a flame can flashback to the source of vapors. Used as a rocket propellant and to make other chemicals.
Colour:	CLEAR, COLORLESS LIQUID
Odour:	Characteristic ammonia like fishy odor of aliphatic hydrazines
Melting point/freezing point:	-57.2°C
Boiling point or initial boiling point and boiling range:	62-64°C (753 mmHg)
Flammability:	Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.
Lower and upper explosion limit/flammability limit:	Lower 2% by vol; Upper 95% by vol
Flash point:	-18°C
Auto-ignition temperature:	480° F (NTP, 1992)
Decomposition temperature:	no data available
pH:	STRONGLY ALKALINE LIQ
Kinematic viscosity:	0.492 millipascal second @ 25 deg C

Solubility:	Decomposes (NTP, 1992)
Partition coefficient n-octanol/water:	log Kow = -1.19 /Estimated/
Vapour pressure:	103 mm Hg (20 °C)
Density and/or relative density:	0.785
Relative vapour density:	1.94 (vs air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

15 ppm; NIOSH considers 1,1-dimethylhydrazine to be a potential occupational carcinogen.
On combustion, forms toxic fumes including nitrogen oxides. The substance is a strong reducing agent. It reacts violently with oxidants. The substance is a strong base. It reacts violently with acid and is corrosive. Reacts with oxygen. This generates fire and explosion hazard. Attacks plastics.

Chemical stability

Solution stored in dark and cold are relatively stable in absence of oxidants

Possibility of hazardous reactions

It is flammable over a wide range of vapor air concentrations.The vapour is heavier than air and may travel along the ground; distant ignition possible.1,1-DIMETHYLHYDRAZINE is a powerful reducing agent. Ignition can occur on contact with oxidizing agents such hydrogen peroxide and fuming nitric acid [Haz. Chem. Data(1966)]. Also reacts as a base to neutralize acids in exothermic reactions.

Conditions to avoid

no data available

Incompatible materials

Contact of dicyanofurazan, or its N-oxide (dicyanofuroxan), with ... dimethylhydrazine ... is instantaneously explosive.

Hazardous decomposition products

When heated to decomp it emits highly toxic fumes of /nitrogen oxides/.

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 Mouse oral 265 mg/kg from table

Inhalation: LC50 Rat inhalation 252 ppm/4 hr

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

Cancer Classification: Group B2 Probable Human Carcinogen

Reproductive toxicity

No information is available on the reproductive or developmental effects of 1,1-dimethylhydrazine in humans. Sperm abnormalities and decreased sperm counts were observed in animals injected with 1,1-dimethylhydrazine. Birth defects were not observed in

the offspring of animals exposed intraperitoneally to 1,1-dimethylhydrazine.

STOT-single exposure

The substance is irritating to the eyes, skin and respiratory tract. Inhalation of the vapour may cause lung oedema. See Notes. The substance may cause effects on the central nervous system and liver.

STOT-repeated exposure

The substance may have effects on the blood. This may result in anaemia. This substance is possibly carcinogenic to humans.

Aspiration hazard

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

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC50 Pimephales promelas (Fathead minnow, 30 day old) 7.85 mg/L/96 hr (confidence limit: 7.16-8.62 mg/L); flow-through, 24.5 deg C, 7.4 mg/L dissolved O2, hardness 46.4 mg CaCO3/L, alkalinity 42.8 mg CaCO3/L

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

Contaminated wastewater from the NASA Kennedy Space station was studied in batch cultures and trickle bed reactors to monitor the degradation rates of hydrazine containing rocket fuels(1,2). The half-life of structurally similar methylhydrazine in batch cultures (Rhodococcus B30 or Achromobacter sp.) and trickle bed reactors was about 2.5 and 12 days, respectively(1). Biodegradation may be a significant removal process at low concentrations in soils or ambient waters, but at higher concentrations hydrazines are toxic to microorganisms(2). Concentrations of hydrazine and 1,1-dimethylhydrazine that reduced bacterial metabolism by 50% ranged from 14.6 to 145 mg/L and from 19.2 to 9,060 mg/L, respectively(3).

Bioaccumulative potential

An estimated BCF value of 3 was calculated for 1,1-dimethylhydrazine(SRC), using an estimated log Kow of -1.19(1) and a recommended regression-derived equation(2). According to a classification scheme(3), this BCF value suggests that

bioconcentration in aquatic organisms is low(SRC).

Mobility in soil

Of the initial amount of 1,1-dimethylhydrazine in cleaned sand (100% sand), Vandenburg Air Force Base (VAFB) soil (99.1% sand, 0.4% clay, pH 6.1), organic soil (96.1% sand, 1% clay, 1% carbon, pH 6.4), and clay (69.3% sand, 27.95% clay, pH 3.7), 5%, 20%, 15%, and 30% was adsorbed, respectively. Passage of 2 liters of distilled, deionized water at 5 ml/min through columns containing sand, VAFB soil, organic soil and clay (10% clay soil plus 90% pure sand) in equilibrium with 10 ml of a 0.1 v/v solution of 1,1-dimethylhydrazine resulted in 99.9%, 42.5%, 21.9%, and 7.2% recovery of this compound, respectively(1). As the hydrazines are all very basic chemicals, adsorption to acidic, clay soils is expected(1).

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: UN1163 (For reference only, please check.)
IMDG: UN1163 (For reference only, please check.)
IATA: UN1163 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: DIMETHYLHYDRAZINE, UNSYMMETRICAL (For reference only, please check.)
IMDG: DIMETHYLHYDRAZINE, UNSYMMETRICAL (For reference only, please check.)
IATA: DIMETHYLHYDRAZINE, UNSYMMETRICAL (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: Yes
IMDG: Yes
IATA: Yes

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

Not 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

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. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT take working clothes home. Rinse contaminated clothing with plenty of water because of fire hazard.