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SAFETY DATA SHEETS

According to the UN GHS revision 10

Version: 1.1
Creation Date: July 15, 2024
Revision Date: January 16, 2025

SECTION 1: Identification

1.1 GHS Product identifier

Product name Methylhydrazine

1.2 Other means of identification

Product number CCNP900141
Other names HydraZine,methyl; monomethylhydrazine; CH3NHNH2

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 Chemical 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

Carcinogenicity, Category 1B

2.2 GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger
Hazard statement(s) H350 May cause cancer
Precautionary statement(s)
Prevention P203 Obtain, read and follow all safety instructions before use.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
Response 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.

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
Methylhydrazine	Methylhydrazine	60-34-4	200-471-4	≈ 99%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest. Artificial respiration may be needed. 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. Refer for medical attention .

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. Give one or two glasses of water to drink. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

Methyl hydrazine vapors are extremely toxic and the liquid is corrosive to skin. Methyl hydrazine is the strongest convulsant and the most toxic of methyl-substituted hydrazine derivatives. It is more toxic than hydrazine. At high doses, it is a strong central nervous system poison that can lead to convulsions and death. Skin rash may be aggravated by skin exposure. (EPA, 1998)

4.3 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: Fire-fighting measures

5.1 Suitable extinguishing media

Use flooding quantities of water. Use water spray to keep fire-exposed containers cool. Fight fire from protected location or maximum possible distance. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products.

5.2 Specific hazards arising from the chemical

Extremely flammable; ignites spontaneously under almost all normal temperature conditions. Water used to extinguish a fire may cause pollution and should be diked for later disposal. Water may be ineffective in extinguishing fires due to the chemical's low flash point. Because of the wide flammability limits, low flash point, and reignition hazard, dry chemicals, carbon dioxide, water spray, and foam may not be as effective as water dilution of fire area. The vapor is heavier than air; thus it may accumulate sufficiently to flash back. Methylhydrazine fires produce irritating nitrogen oxides. Ignites spontaneously in air when in contact with porous materials (e.g., earth, asbestos, wood, or cloth). Also ignites spontaneously on contact with strong oxidizing agents (e.g., fluorine, chlorine trifluoride, fuming nitric acid, and nitrogen tetroxide). Heat or flame should be avoided because chemical is extremely flammable and explosive. (EPA, 1998)

5.3 Special protective actions for fire-fighters

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

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. Do NOT let this chemical enter the environment.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment.

6.3 Methods and materials for containment and cleaning up

Wear butyl rubber gloves, self-contained breathing apparatus, eye protection and impervious clothing. Body shield should be available. Eliminate all sources of ignition and flammables. On skin or clothing. Wash skin immediately. Remove contaminated clothing at once. Spills: Cover spill with a 1:1:1 mixture by weight of sodium carbonate or calcium carbonate, clay cat litter (bentonite) and sand. Scoop the solid into a container, transport to the fume hood and slowly add to water allowing 20 ml water for each 1 g of methylhydrazine. Filter off the clay and sand. For each 1 g of methylhydrazine, place 41 ml (about 25% excess) of commercial laundry bleach (containing about 5.25% sodium hypochlorite) into a 3-necked round-bottom flask equipped with a stirrer, thermometer and dropping funnel. Add the aqueous methylhydrazine dropwise to the stirred hypochlorite solution, monitoring the rate of addition by rise in temperature. The temperature is maintained at 45-50 deg C and addition takes about 1 hour. Stirring is continued for 2 hours until the temperature gradually falls to room temperature.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames, NO sparks and NO smoking. NO contact with strong oxidizing agents. NO contact with hot surfaces. Closed system, ventilation, explosion-proof electrical equipment and lighting. 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

Fireproof. Separated from strong oxidants, strong acids, metal oxides, porous materials and food and feedstuffs. Dry. Well closed. Keep under inert gas.Store in a cool, dry, well-ventilated location. Separate from acids, oxidizing materials, halogens, & air. Outside or detached storage is preferred.

SECTION 8: Exposure controls/personal protection

8.1 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); MAK sensitization of skin (SH)

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	Methylhydrazine is a colorless liquid with an ammonia-like odor. Flash point below 75°F. Spontaneous ignition may occur in contact with oxidizing materials. Very toxic by inhalation and by skin absorption. Produces toxic oxides of nitrogen during combustion. Rate of onset: Immediate Persistence: Hours - days Odor threshold: 1-10 ppm Source/use/other hazard: Solvent, rocket fuel; flammable; irritating to skin/eyes.
Colour	Clear liquid
Odour	Odor characteristic of short chain, organic amines
Melting point/freezing point	-21°C
Boiling point or initial boiling point and boiling range	88-90°C(lit.)
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 flammable limit: 2.5% by volume; Upper flammable limit: 92% by volume
Flash point	-8°C
Auto-ignition temperature	385°F
Decomposition temperature	no data available
pH	Mildly alkaline base
Kinematic viscosity	0.775 cP at 25 deg C
Solubility	Insoluble (<1 mg/ml at 75° F) (NTP, 1992)
Partition coefficient n-octanol/water	log Kow= -1.05
Vapour pressure	37.5 mm Hg (20 °C)
Density and/or relative density	0.875g/mLat 20°C(lit.)
Relative vapour density	1.6 (vs air)
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

20 ppm; NIOSH considers methyl hydrazine to be a potential occupational carcinogen.
May explode on heating or on contact with metal oxides. The substance may ignite spontaneously on contact with air and porous materials such as earth, asbestos, wood and cloth. Decomposes on burning. This produces toxic and corrosive gases including nitrogen oxides. The substance is a strong reducing agent. It reacts violently with oxidants. This generates fire hazard. The substance is a medium strong base. Reacts violently with strong acids.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

Very dangerous fire hazard when exposed to heat or flame.The vapour mixes well with air, explosive mixtures are easily formed.METHYLHYDRAZINE is a powerful reducing agent. Ignites upon contact with oxidizing agents i.e. dinitrogen tetraoxide, hydrogen peroxide [Hawley]. Water used to extinguish a fire may cause pollution and should be diked for later disposal. Gives basic solutions with water that generate heat when water is added.

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Reacts violently with oxidizing materials, oxygen, & peroxides; sometimes resulting in autoignition.

10.6 Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /nitrogen oxide/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 Mouse oral 33 mg/kg
- Inhalation: LC50 Rat inhalation 74-78 ppm/4 hr (calculated)
- 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

A3; Confirmed animal carcinogen with unknown relevance to humans.

Reproductive toxicity

No information is available on the reproductive or developmental effects of methylhydrazine in humans. Malformations have not been observed in the offspring of rats orally exposed to methylhydrazine, while malformations were reported in the toad. The morphology of sperm has been reported to be affected in mice orally exposed to methylhydrazine.

STOT-single exposure

The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. The substance may cause effects on the central nervous system, liver and blood. This may result in liver impairment and the formation of methaemoglobin. Exposure far above the OEL could cause death. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

The substance may have effects on the liver and blood. This may result in liver impairment and the formation of methaemoglobin. 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

12.1 Toxicity

- Toxicity to fish: no data available
- 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

The toxicity of methylhydrazine to microbial species was found to be sufficiently high to prevent its degradation by biological waste treatment(1). Large amounts of methylhydrazine, such as might be released from a spill, are not expected to biodegrade. However, biodegradation of lower methylhydrazine concn may occur(SRC). Methylhydrazine at 500 mg/l, present in a wastewater mixture of hydrazine compounds, was incubated with an inoculum prepared from a trickling filter plant; following a 24 hour lag period, this mixture of compounds was biodegraded as measured by oxygen uptake(2). 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(3,4). The half-life of methylhydrazine in batch cultures (Rhodococcus B30 or Achromobacter sp.) and trickle bed reactors was about 2.5 and 12 days, respectively(3). Biodegradation may be a significant removal process at low concentrations in soils or ambient waters, but at higher concentrations hydrazines are toxic to microorganisms(4). 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(5).

12.3 Bioaccumulative potential

An estimated BCF value of 3 was calculated for methylhydrazine(SRC), using a measured log Kow of -1.05(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF value suggests that bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

Using a structure estimation method based on molecular connectivity indices(1), the Koc for methylhydrazine can be estimated to be 18(SRC). According to a classification scheme(2), this estimated Koc value suggests that methylhydrazine is expected to have very high mobility in soil. The pKa of methylhydrazine is 7.87(3). This pKa value indicates that this compound will partially exist as a cation in moist soils and cations generally adsorb more strongly to organic carbon and clay than the corresponding free base(4).

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: UN1244 (For reference only, please check.) IMDG: UN1244 (For reference only, please check.) IATA: UN1244 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: METHYLHYDRAZINE (For reference only, please check.) IMDG: METHYLHYDRAZINE (For reference only, please check.) IATA: METHYLHYDRAZINE (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
Methylhydrazine	Methylhydrazine	60-34-4	200-471-4
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)			Not 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, 2024
Revision Date	January 16, 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

Depending on the degree of exposure, periodic medical examination is suggested.Specific treatment is necessary in case of poisoning with this substance; the appropriate means with instructions must be available.Do NOT take working clothes home.Rinse contaminated clothing with plenty of water because of fire hazard.

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