Chemical Safety Data Sheet MSDS / SDS

Methyl isocyanate 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: Methyl isocyanate

CAS: 624-83-9

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

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

Acute toxicity - Category 3, Dermal
Skin irritation, Category 2
Serious eye damage, Category 1
Skin sensitization, Category 1
Acute toxicity - Category 2, Inhalation
Specific target organ toxicity – single exposure, Category 3
Respiratory sensitization, Category 1
Reproductive toxicity, Category 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
H311 Toxic in contact with skin
H315 Causes skin irritation
H318 Causes serious eye damage
H317 May cause an allergic skin reaction
H330 Fatal if inhaled
H335 May cause respiratory irritation
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

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.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
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

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.
P302+P352 IF ON SKIN: Wash with plenty of water/...
P316 Get emergency medical help immediately.
P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
P332+P317 If skin irritation occurs: Get medical help.
P362+P364 Take off contaminated clothing and wash it before reuse.
P305+P354+P338 IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P317 Get medical help.
P333+P317 If skin irritation or rash occurs: Get medical help.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P320 Specific treatment is urgent (see ... on this label).
P319 Get medical help if you feel unwell.
P342+P316 If experiencing respiratory symptoms: Get emergency medical help immediately.
P318 IF exposed or concerned, get medical advice.

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:	Methyl isocyanate
Common names and synonyms:	Methyl isocyanate
CAS number:	624-83-9
EC number:	210-866-3
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 for medical attention.

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. 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 .

Most important symptoms/effects, acute and delayed

This compound is a skin irritant and can cause permanent eye damage. A concentration of 2 ppm has been reported toxic in humans. Methyl isocyanate attacks the respiratory system, eyes and skin. It can injure the lungs and bronchial airways, cause permanent eye damage, and death. Death has been attributed to various forms of respiratory distress. (EPA, 1998)

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

Most treatment is symptomatic. Mydriatics, systemic analgesics, and topical antibiotics ... /such as sulfacetamide/ may be used for corneal abrasions. There is no effective therapy for sensitized workers, and these people should be moved to a work site devoid of exposure to isocynates. Isocyanates

SECTION 5: Firefighting measures

Suitable extinguishing media

Evacuation: If fire becomes uncontrollable or container is exposed to direct flame - consider evacuation of one-third (1/3) mile radius.

Specific hazards arising from the chemical

Reacts violently with water. Extremely flammable; may be ignited by heat, sparks, or flames. Vapors may travel to a source of ignition and flash back. Container may explode violently in heat of fire. Vapor explosion and poison hazard indoors, outdoors, or in sewers. Runoff to sewer may create fire or explosion hazard. When heated to decomposition, it emits toxic fumes of nitrogen oxides. Avoid water, acids, alkali, amines, iron, tin, copper, and other catalysts. Avoid heat, flame, oxidizers, water. Hazardous polymerization may occur. Methyl isocyanate (MIC) will react with water, or in the presence of catalysts (such as sodium hydroxide, sodium methoxide, triphenylarsine, triethyl phosphine, metallic chlorides) to form either a cyclic trimer (trimethyl isocyanurate) or a gummy, resinous polymer. These reactions are exothermic, producing about 540 Btu per pound of MIC. Heat produced in these reactions may result in pressure build up and rupturing of tanks. (EPA, 1998)

Special protective actions for fire-fighters

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

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Ventilation. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Cautiously neutralize spilled liquid with caustic soda. 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: chemical protection suit including self-contained breathing apparatus. Ventilation. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Cautiously neutralize spilled liquid with caustic soda. 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

Activated alumina is used as sorbent for hydrolytic removal of methyl isocyanate from waste gases.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. NO contact with water, acids, bases or oxidizing agents. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. 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. See Chemical Dangers. Cool. Dry. Store only if stabilized. Store in an area without drain or sewer access.Fireproof ... Store only if stabilized.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 0.02 ppm as TWA; 0.06 ppm as STEL; (skin); (SEN).MAK: 0.024 mg/m3, 0.01 ppm; peak limitation category: I(1); pregnancy risk group: D.EU-OEL: 0.02 ppm as STEL

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:	Methyl isocyanate is a colorless low-boiling liquid (b.p. 39°C) that is denser than water. Flash point is less than 20° F. Very toxic by inhalation. Can be absorbed through the skin. Has a sharp odor, but the sense of smell cannot be relied upon to warn of the presence of vapors at low concentrations. Rate of onset: Immediate Persistence: Minutes to hours Odor threshold: 2.1 ppm Source/use/other hazard: Intermediate in manufacturing; reacts with H20 (don't use in fire).
Colour:	Colorless liquid
Odour:	Sharp, unpleasant odor
Melting point/freezing point:	-80°C
Boiling point or initial boiling point and boiling range:	39°C
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: 5.3% by volume; Upper flammable limit: 26% by volume
Flash point:	-18°C
Auto-ignition temperature:	995° F (USCG, 1999)
Decomposition temperature:	no data available
pH:	no data available
Kinematic viscosity:	no data available
Solubility:	Decomposes (NTP, 1992)
Partition coefficient n-octanol/water:	log Kow = 0.79 (est)
Vapour pressure:	348 mm Hg at 68° F (EPA, 1998)
Density and/or relative density:	0.88 g/cm3
Relative vapour density:	About twice as heavy as air (EPA, 1998) (Relative to Air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

The substance polymerizes when pure. The substance may polymerize due to heating and under the influence of metals and catalysts. Decomposes on contact with water. Decomposes rapidly on contact with acids or bases. This produces toxic gases of hydrogen cyanide, nitrogen oxides and carbon monoxide. Attacks some forms of plastic, rubber and coatings.

Chemical stability

no data available

Possibility of hazardous reactions

Flammable liquid ...The vapour is heavier than air and may travel along the ground; distant ignition possible. The vapour mixes well with air, explosive mixtures are easily formed.Airborne vapors of METHYL ISOCYANATE are explosive when exposed to heat, flame or sparks. Vapor may ignite on contact with strong oxidizing agents. Emits toxic fumes of nitriles and oxides of nitrogen when heated to decomposition [Lewis, 3rd ed., 1993, p. 860]. Caused the death of thousands in 1984 in Bhopal, India when released accidentally as a vapor following an exothermic reaction caused by contamination with water [Chem. Eng. News, 1985, 63(6), p. 27]. Reacts rapidly with acids and bases (including amines). May polymerize in contact with iron, tin, copper and certain other catalysts such as triphenylarsenic oxide, triethyl phosphine and tributyltin oxide. Polymerizes at elevated temperatures. Attacks some plastics, rubbers, and coatings [NTP].

Conditions to avoid

no data available

Incompatible materials

Reacts with water, which may cause runaway reaction ...

Hazardous decomposition products

The substance decomposes on contact with water. The substance decomposes rapidly on contact with acids and bases producing toxic gases (hydrogen cyanide, nitrogen oxides, carbon monoxide).

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 Rat oral 140 mg/kg (95% confidence limit 55-340 mg/kg)

Inhalation: LC50 Mouse inhalation 12,200 ppb/6 hr

Dermal: LD50 Rabbit percutaneous 1,800 mg/kg (95% confidence limit 950-3,410 mg/kg)

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

no data available

Reproductive toxicity

After the Bhopal, India, accident, an unusually high percentage of survivors had disorders of the reproductive system, including leukorrhea, pelvic inflammatory disease, excessive menstrual bleeding, and suppression of lactation. Other adverse effects included increases in the number of stillbirths, spontaneous abortions, and increased infant mortality. Animal studies have reported increased incidence of fetal deaths and decreased fertility, live litter size, fetal body weight, and neonatal survival following inhalation exposure to methyl isocyanate during pregnancy.

STOT-single exposure

The substance is severely irritating to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation of the vapour may cause lung oedema. See Notes. Inhalation may cause asthma-like reactions. Exposure could cause death. The effects may be delayed. Medical observation is indicated.

STOT-repeated exposure

Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the respiratory tract. Causes toxicity to human reproduction or development.

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: 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

Persistence and degradability

Since methyl isocyanate hydrolyzes rapidly in water(1), biodegradation is not expected to be an important fate process(SRC).

Bioaccumulative potential

Since methyl isocyanate hydrolyzes rapidly in water(1), bioconcentration in aquatic organisms is not expected to be an important process(SRC).

Mobility in soil

Since methyl isocyanate hydrolyzes rapidly in water(1), adsorption to soil, sediment, and suspended solids are not expected to be an important process(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: UN2480 (For reference only, please check.)
IMDG: UN2480 (For reference only, please check.)
IATA: UN2480 (For reference only, please check.)

UN Proper Shipping Name

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

Not Listed.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Not 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

Reacts violently with fire extinguishing agents such as water.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.Anyone who has shown symptoms of asthma due to this substance should avoid all further contact.The symptoms of asthma 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.The odour warning when the exposure limit value is exceeded is insufficient.Do NOT take working clothes home.