

SAFETY DATA SHEETS

According to the UN GHS revision 9

Version: 1.0
Creation Date: July 15, 2019
Revision Date: July 15, 2019

SECTION 1: Identification

1.1 GHS Product identifier

Product name 4,4'-methylenediphenyl diisocyanate

1.2 Other means of identification

Product number -
Other names Methylene di-p-phenyl diisocyanate, flakes; 4,4'-Diphenylmethane Diisocyanate; PMDI

1.3 Recommended use of the chemical and restrictions on use

Identified uses Industrial and scientific research use.
Uses advised against no data available

1.4 Supplier's details

Company Shanghai Baishun Biotechnology Co., Ltd
Address No. 26, Lane 918, Lianye Road, Zhelin Town, Fengxian District, Shanghai, 201400, China
Telephone +86-21-37581181

1.5 Emergency phone number

Emergency phone number +86-21-37581181
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

Skin irritation, Category 2
Eye irritation, Category 2
Skin sensitization, Category 1
Acute toxicity - Category 4, Inhalation
Specific target organ toxicity – single exposure, Category 3
Respiratory sensitization, Category 1
Carcinogenicity, Category 2
Specific target organ toxicity – repeated exposure, Category 2

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word	Danger
Hazard statement(s)	H315 Causes skin irritation H319 Causes serious eye irritation H317 May cause an allergic skin reaction H332 Harmful if inhaled H335 May cause respiratory irritation H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled H351 Suspected of causing cancer H373 May cause damage to organs through prolonged or repeated exposure
Precautionary statement(s)	
Prevention	P264 Wash ... thoroughly after handling. 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. P260 Do not breathe dust/fume/gas/mist/vapours/spray.
Response	P302+P352 IF ON SKIN: Wash with plenty of water/... P321 Specific treatment (see ... on this label). P332+P317 If skin irritation occurs: Get medical help. P362+P364 Take off contaminated clothing and wash it before reuse. P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. 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. P317 Get medical help. 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+P233 Store in a well-ventilated place. Keep container tightly closed. 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
4,4'-methylenediphenyl diisocyanate	4,4'-methylenediphenyl diisocyanate	101-68-8	202-966-0	100%

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

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. Refer for medical attention .

4.2 Most important symptoms/effects, acute and delayed

Breathlessness, chest discomfort, and reduced pulmonary function. (USCG, 1999)

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

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Isocyanates, aliphatic thiocyanates, and related compounds

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Carbon dioxide or dry chemical.

5.2 Specific hazards arising from the chemical

Special Hazards of Combustion Products: Toxic vapors are generated when heated.
Behavior in Fire: Solid melts and burns (USCG, 1999)

5.3 Special protective actions for fire-fighters

Use powder, carbon dioxide.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Sweep spilled substance into covered sealable containers. Carefully collect remainder. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: chemical protection suit including self-contained breathing apparatus. Sweep spilled substance into covered sealable containers. Carefully collect remainder. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Ventilate area of spill or leak. for small quantities, absorb on paper towels. ... burn the paper in suitable location away from combustible materials. large quantities can be collected & atomized in suitable combustion chamber equipped with appropriate effluent

gas cleaning device. disposal methods: 1. by absorbing on vermiculite, dry sand, earth or a similar material & disposing in a secured sanitary landfill. 2. by atomizing in suitable combustion chamber equipped with appropriate effluent gas cleaning device.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames. 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. Keep in the dark. Isocyanates are transported in railroad tank cars, tank trucks, tanks in ships, containers, and drums. They are stored in steel tanks and processed in steel equipment. For long-term storage stainless steel is recommended. To avoid contamination by atmospheric moisture, a dry air or inert gas blanket is essential. Isocyanates

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

TLV: 0.005 ppm as TWA. MAK: (inhalable fraction): 0.05 mg/m³; peak limitation category: I(1); skin absorption (H); sensitization of respiratory tract and skin (SAH); carcinogen category: 4; pregnancy risk group: C

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 safety goggles or face shield.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state	Solid. Crystalline.
Colour	White.
Odour	Odorless
Melting point/freezing point	39 - 43 °C.
Boiling point or initial boiling point and boiling range	> 300 °C. Atm. press.: 1 013 hPa.
Flammability	Combustible Solid
Lower and upper	no data available

explosion limit/flammability limit	
Flash point	211 °C. Atm. press.:1 000 hPa.
Auto-ignition temperature	> 601 °C. Atm. press.:Ca. 1 013 hPa.
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	Insoluble (NTP, 1992)
Partition coefficient n-octanol/water	log Pow = 4.51. Temperature:22 °C.
Vapour pressure	< 0.002 Pa. Temperature:20 °C.
Density and/or relative density	1.32. Temperature:20 °C.;1.18 g/cm ³ . Temperature:50 °C.
Relative vapour density (air = 1)	8.6
Particle characteristics	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

The substance may polymerize under the influence of temperatures above 204°C. On combustion, forms toxic and corrosive fumes including nitrogen oxides and hydrogen cyanide (see ICSC 0492). Reacts readily with water. This produces insoluble polyureas. Reacts violently with acids, alcohols, amines, bases and oxidants. This generates fire and explosion hazard.

10.2 Chemical stability

no data available

10.3 Possibility of hazardous reactions

A flammable liquid. Isocyanates and thioisocyanates, such as DIPHENYLMETHANE-4,4'-DIISOCYANATE, are incompatible with many classes of compounds, reacting exothermically to release toxic gases. Reactions with amines, aldehydes, alcohols, alkali metals, ketones, mercaptans, strong oxidizers, hydrides, phenols, and peroxides can cause vigorous releases of heat. Acids and bases initiate polymerization reactions in these materials. Some isocyanates react with water to form amines and liberate carbon dioxide. Base-catalysed reactions of isocyanates with alcohols should be carried out in inert solvents. Such reactions in the absence of solvents often occur with explosive violence, [Wischmeyer(1969)].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Strong alkalis, acids, alcohol [Note: Polymerizes at 450 degrees F].

10.6 Hazardous decomposition products

When heated to decomposition it emits toxic fumes of /nitrogen oxides and sulfur oxides/.

SECTION 11: Toxicological information

Acute toxicity

- Oral: LD50 - rat (male/female) - > 2 000 mg/kg bw.
- Inhalation: LC50 - rat (male/female) - 0.49 mg/L air (analytical).
- Dermal: LD50 - rabbit (male/female) - > 9 400 mg/kg bw.

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 of 4,4'-methylenediphenyl diisocyanate or polymeric 4,4'-methylenediphenyl diisocyanate in humans. There is limited evidence in experimental animals for the carcinogenicity of a mixture containing monomeric and polymeric 4,4'-methylenediphenyl diisocyanate. Overall evaluation: 4,4'-Methylenediphenyl diisocyanate (industrial preparation) is not classifiable as to its carcinogenicity in humans (Group 3).

Reproductive toxicity

No information is available on the reproductive or developmental effects of MDI in humans. Decreased placental and fetal weights and an increased number of fetuses per litter with skeletal variations were reported in one inhalation study in rats. These effects were observed only at the highest dose, and may have been related to maternal toxicity.

STOT-single exposure

Lachrymation. The substance is irritating to the eyes, skin and respiratory tract. The substance may cause effects on the lungs. This may result in impaired functions.

STOT-repeated exposure

Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation may cause asthma. See Notes.

Aspiration hazard

Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

SECTION 12: Ecological information**12.1 Toxicity**

- Toxicity to fish: LC0 - *Oryzias latipes* - > 3 000 mg/L - 48 h.
- Toxicity to daphnia and other aquatic invertebrates: EC50 - *Daphnia magna* - 129.7 mg/L - 24 h.
- Toxicity to algae: NOELR - *Desmodesmus subspicatus* (previous name: *Scenedesmus subspicatus*) - 1 640 mg/L - 3 d.
- Toxicity to microorganisms: EC50 - activated sludge - > 100 mg/L - 3 h.
Remarks: Respiration rate.

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

4,4'-Methylenediphenyl diisocyanate hydrolyzes rapidly in aqueous solution(1-3); therefore, bioconcentration will not be an important environmental fate process(SRC). Exposure of carp to 0.00001% concentrations of 4,4'-methylenediphenyl diisocyanate for an eight week period resulted in no bioaccumulations(4).

12.4 Mobility in soil

4,4'-Methylenediphenyl diisocyanate hydrolyzes rapidly in aqueous solution(1-3); therefore, leaching and adsorption to moist soil and sediment will not be an important environmental fate process(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: 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.)

14.2 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.)

14.3 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.)

14.4 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.)

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
4,4'-methylenediphenyl diisocyanate	4,4'-methylenediphenyl diisocyanate	101-68-8	202-966-0
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

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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

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. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance. MDI may sensitize workers so that they react to other isocyanates (asthma). Do NOT take working clothes home.

Any questions regarding this SDS, Please send your inquiry to sds@xixisys.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.