

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-methyl-m-phenylenediamine

1.2 Other means of identification

Product number -

Other names 1,3-Benzenediamine, 4-methyl-; 2,4-TDA; tertralg

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

Acute toxicity - Category 3, Oral
Acute toxicity - Category 4, Dermal
Skin sensitization, Category 1
Germ cell mutagenicity, Category 2
Carcinogenicity, Category 1B
Specific target organ toxicity – repeated exposure, Category 2
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 2
Reproductive toxicity, Category 2

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word	Danger
Hazard statement(s)	H301 Toxic if swallowed H312 Harmful in contact with skin H317 May cause an allergic skin reaction H341 Suspected of causing genetic defects H350 May cause cancer H373 May cause damage to organs through prolonged or repeated exposure H411 Toxic to aquatic life with long lasting effects
Precautionary statement(s)	
Prevention	P264 Wash ... thoroughly after handling. P270 Do not eat, drink or smoke when using this product. 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. P203 Obtain, read and follow all safety instructions before use. P260 Do not breathe dust/fume/gas/mist/vapours/spray. P273 Avoid release to the environment.
Response	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/... P317 Get medical help. P362+P364 Take off contaminated clothing and wash it before reuse. P333+P317 If skin irritation or rash occurs: Get medical help. P318 IF exposed or concerned, get medical advice. P319 Get medical help if you feel unwell. P391 Collect spillage.
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
4-methyl-m-phenylenediamine	4-methyl-m-phenylenediamine	95-80-7	202-453-1	100%

SECTION 4: First-aid measures

4.1 Description of necessary first-aid measures

If inhaled

Fresh air, rest.

Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap.

Following eye contact

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

Following ingestion

Rinse mouth.

4.2 Most important symptoms/effects, acute and delayed

Exposure Routes: inhalation, skin absorption, ingestion, skin and/or eye contact
Symptoms: Irritation eyes, skin, nose, throat; dermatitis; ataxia, tachycardia, nausea, vomiting, convulsions, respiratory depression; methemoglobinemia, cyanosis, headache, lassitude (weakness, exhaustion), dizziness, bluish skin; liver injury; [potential occupational carcinogen] Target Organs: Eyes, skin, respiratory system, blood, cardiovascular system, liver (NIOSH, 2016)

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

Irrigate eyes with water. Wash contaminated area of body with soap and water.

SECTION 5: Fire-fighting measures

5.1 Suitable extinguishing media

Use water spray, foam, powder, carbon dioxide.

5.2 Specific hazards arising from the chemical

Special Hazards of Combustion Products: Toxic fumes are generated when heated.
Behavior in Fire: Toxic gases are produced when heated to decomposition temperature. (USCG, 1999)

5.3 Special protective actions for fire-fighters

Use water spray, foam, powder, carbon dioxide.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Then store and dispose of according to local regulations.

6.2 Environmental precautions

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Spillage Disposal. Personal protection: chemical protection suit including self-contained breathing apparatus. Do not let this chemical enter the environment. Do not wash away into sewer. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Then store and dispose of according to local regulations.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

NO open flames. Closed system, dust 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

Well closed. Separated from oxidants and acids. Separated from food and feedstuffs. Store in an area without drain or sewer access. Do NOT store or transport in containers made from aluminium or copper and its alloys. Provision to contain effluent from fire extinguishing. PRECAUTIONS FOR "CARCINOGENS": Storage site should be as close as practical 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

8.1 Control parameters

Occupational Exposure limit values

MAK: sensitization of skin (SH); skin absorption (H); carcinogen category: 3B

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 (if molten) 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 powder.
Colour	Pale brown.
Odour	no data available
Melting point/freezing point	99 °C.
Boiling point or initial boiling point and boiling range	288 °C. Atm. press.: Stated as atmospheric pressure. Remarks: Uncertainty of $\pm 2^\circ\text{C}$.
Flammability	Combustible Solid
Lower and upper explosion limit/flammability limit	no data available
Flash point	160 °C. Atm. press.: 758 - 768 mm Hg.
Auto-ignition temperature	505 °C. Atm. press.: 750 - 765 mm Hg.
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	1 to 5 mg/mL at 70° F (NTP, 1992)
Partition coefficient n-octanol/water	log Pow = 0.074. Temperature: 25 °C.
Vapour pressure	0.017 Pa. Temperature: 25 °C. Remarks: Uncertainty of ± 0.002 .
Density and/or relative	1.26. Temperature: 20 °C.

density
Relative vapour density (air = 1): 4.2
Particle characteristics no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

NIOSH considers toluenediamine to be a potential occupational carcinogen.

Toluenediamine

Decomposes on heating. This produces toxic and corrosive fumes including nitrogen oxides. Reacts with oxidants and acids. This generates fire and explosion hazard. Attacks copper and its alloys and aluminium.

10.2 Chemical stability

Readily becomes oxidized in neutral or alkaline soln to form dark products

10.3 Possibility of hazardous reactions

If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc. Dust explosion possible if in powder or granular form, mixed with air. 2,4-TOLUENEDIAMINE neutralizes acids in exothermic reactions to form salts plus water. May be incompatible with isocyanates, halogenated organics, peroxides, phenols (acidic), epoxides, anhydrides, and acid halides. May generate hydrogen, a flammable gas, in combination with strong reducing agents such as hydrides. Reacts vigorously with oxidizing agents (USCG, 1999).

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

STABILITY: This chemical is sensitive to air and moisture. It is sensitive to temperatures greater than 104 F. It is also sensitive to prolonged exposure to light. This compound readily becomes oxidized in neutral or alkaline solutions to form a dark product. Solutions of this chemical in water, DMSO, 95% ethanol or acetone should be stable for 24 hours under normal lab conditions. **REACTIVITY:** This compound may react with acids, acid chlorides, acid anhydrides, strong oxidizing agents and chloroformates. It is also incompatible with isocyanates. (NTP, 1992)

10.6 Hazardous decomposition products

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

SECTION 11: Toxicological information

Acute toxicity

- Oral: LDLo Rat oral 500 mg/kg.
- 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

No data are available in humans. Sufficient evidence of carcinogenicity in animals.
OVERALL EVALUATION: Group 2B: The agent is possibly carcinogenic to humans.

Reproductive toxicity

In humans occupationally exposed to toluene-2,4-diamine, several studies did not report any statistically significant reproductive or developmental effects. Developmental and reproductive effects were observed in animals, including a significant decrease in the number of births and increases in maternal deaths, stillbirths, and resorptions.

STOT-single exposure

The substance is mildly irritating to the eyes. The hot liquid may cause severe skin burns. The substance may cause effects on the liver and blood.

STOT-repeated exposure

Repeated or prolonged contact may cause skin sensitization. The substance may have effects on the liver and kidneys. This may result in liver function impairment and kidney impairment. This substance is possibly carcinogenic to humans. May cause genetic damage in humans. May cause reproductive toxicity in humans.

Aspiration hazard

No indication can be given about the rate at which a harmful concentration of this substance in the air is reached on evaporation at 20°C.

SECTION 12: Ecological information

12.1 Toxicity

- Toxicity to fish: LC50 - *Pagrus major* - 0.414 mg/L - 96 h.
- Toxicity to daphnia and other aquatic invertebrates: EC50 - *Daphnia magna* - 1.6 mg/L - 48 h.
- Toxicity to algae: EC50 - *Pseudokirchneriella subcapitata* (previous names: *Raphidocelis subcapitata*, *Selenastrum capricornutum*) - 78.1 µmol/L - 96 h.
- Toxicity to microorganisms: IC50 - *Vibrio fischeri* - 405.7 µmol/L - 15 min.

12.2 Persistence and degradability

AEROBIC: Toluene-2,4-diamine, present at 100 mg/L, reached 0% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(1). A decline of 45% in the theoretical organic carbon of toluene-2,4-diamine was observed after 4 hr exposure to activated sludge in a fill and draw apparatus(2). When incubated with a synthetic batch activated sludge acclimated to the 2,4- and 2,6-isomers, diaminotoluenes, present at 300 mg/L, were 80% biodegraded in 4 days(3). Toluene-2,4-diamine, (ring-labeled), produced 35% ¹⁴C-CO₂ evolution in 375 days using a soil inoculum in the shake flask test(4). Adsorption to soil is expected to attenuate biodegradation(5). Using an inoculum from a munitions manufacturing wastewater treatment plant in Radford, VA, toluene-2,4-diamine, present at 500 mg/L, yielded 41.1 mg COD, with each 0.55 mM addition being consumed within 2-4 days(6).

12.3 Bioaccumulative potential

A BCF range of 1.9-3.3 was measured in fish for toluene-2,4-diamine, present at 1 mg/L, and orange-red killifish (*Oryzias latipes*) which were exposed over an 6-week period(1). According to a classification scheme(3), this BCF range suggests the potential for bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

Using aerobic conditions with a Washington silt loam surface soil (21% sand; 60% silt; 19% clay; pH 5; 1.3% total organic carbon) from a farm field planted with a rotation of corn and soybeans near Bethlehem, PA and a Freehold sandy loam soil (53% sand; 40% silt; 7% clay; pH 5.8; 1.6% total organic carbon) from the Rutgers Experimental Farm, Adelphia, NJ, the Koc of toluene-2,4-diamine were measured to be 1331 and 1346, respectively. Under anaerobic conditions, Koc values were 713 and 1054, respectively(1). According to a classification scheme(2), this estimated Koc value suggests that toluene-2,4-diamine is expected to have low mobility in soil. The estimated pKa of toluene-2,4-diamine is 5.35(3), indicating that this compound will exist partially in the cation form in the environment and cations generally adsorb more strongly to soils containing organic

carbon and clay than their neutral counterparts(4). Aromatic amines are expected to bind strongly to humus or organic matter in soils due to the high reactivity of the aromatic amino group(5,6), suggesting that mobility may be much lower in some soils(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: UN1709 (For reference only, please check.)

IMDG: UN1709 (For reference only, please check.)

IATA: UN1709 (For reference only, please check.)

14.2 UN Proper Shipping Name

ADR/RID: 2,4-TOLUYLENEDIAMINE, SOLID (For reference only, please check.)

IMDG: 2,4-TOLUYLENEDIAMINE, SOLID (For reference only, please check.)

IATA: 2,4-TOLUYLENEDIAMINE, SOLID (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: III (For reference only, please check.)

IMDG: III (For reference only, please check.)

IATA: III (For reference only, please check.)

14.5 Environmental hazards

ADR/RID: Yes

IMDG: Yes

IATA: Yes

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-methyl-m-	4-methyl-m-	95-80-7	202-453-1

phenylenediamine	phenylenediamine	
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

Creation Date July 15, 2019
Revision Date July 15, 2019

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 take working clothes home. Often transported in the molten state.

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.