

ALFAAA15645

## 4,4'-Diaminodiphenylmethane

### SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**产品说明:** 4,4'-二氨基二苯甲烷  
**Product Description:** 4,4'-Diaminodiphenylmethane

**Cat No. :** A15645  
**Synonyms** p,p`-Diaminodiphenylmethane  
**CAS No** 101-77-9  
**Molecular Formula** C13 H14 N2

**Supplier** Avocado Research Chemicals Ltd.  
(Part of Thermo Fisher Scientific)  
Shore Road, Heysham  
Lancashire, LA3 2XY,  
United Kingdom  
Office Tel: +44 (0) 1524 850506  
Office Fax: +44 (0) 1524 850608

**Emergency Telephone Number** For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11  
Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99  
**CHEMTREC** Tel. No. **US**:001-800-424-9300 / **Europe**:001-703-527-3887

**E-mail address** begel.sdsdesk@thermofisher.com

**Recommended Use** Laboratory chemicals.  
**Uses advised against**

### SECTION 2. HAZARD IDENTIFICATION

**Physical State**  
Solid

**Appearance**  
Beige

**Odor**  
Rotten-egg like

#### Emergency Overview

May cause an allergic skin reaction. Suspected of causing genetic defects. Causes damage to organs. Toxic to aquatic life with long lasting effects. May cause cancer.

#### Classification of the substance or mixture

Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity - (single exposure)	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

#### Label Elements

**Signal Word****Danger****Hazard Statements**

H317 - May cause an allergic skin reaction  
 H341 - Suspected of causing genetic defects  
 H370 - Causes damage to organs  
 H411 - Toxic to aquatic life with long lasting effects  
 H350 - May cause cancer

**Precautionary Statements****Prevention**

P201 - Obtain special instructions before use  
 P202 - Do not handle until all safety precautions have been read and understood  
 P262 - Do not get in eyes, on skin, or on clothing  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P270 - Do not eat, drink or smoke when using this product  
 P272 - Contaminated work clothing should not be allowed out of the workplace  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection

**Response**

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P310 - Immediately call a POISON CENTER or doctor  
 P330 - Rinse mouth  
 P308 + P311 - IF exposed or concerned: Call a POISON CENTER or doctor  
 P302 + P352 - IF ON SKIN: Wash with plenty of soap and water  
 P361 + P364 - Take off immediately all contaminated clothing and wash it before reuse

**Storage**

P403 - Store in a well-ventilated place

**Disposal**

P501 - Dispose of contents/ container to an approved waste disposal plant

**Physical and Chemical Hazards**

None identified.

**Health Hazards**

May cause an allergic skin reaction. Suspected of causing genetic defects. Causes damage to organs. May cause cancer.

**Environmental hazards**

Toxic to aquatic life with long lasting effects. . Is not likely mobile in the environment due its low water solubility. Spillage unlikely to penetrate soil.

Toxic to terrestrial vertebrates. This product does not contain any known or suspected endocrine disruptors.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Component	CAS No	Weight %
4,4'-Methylenedianiline	101-77-9	97

**SECTION 4. FIRST AID MEASURES**
**Eye Contact**

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

**Skin Contact**

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Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.

**Inhalation**

Remove from exposure, lie down. Remove to fresh air. If not breathing, give artificial respiration. Immediate medical attention is required.

**Ingestion**

Never give anything by mouth to an unconscious person. Drink plenty of water. Induce vomiting, but only if victim is fully conscious. Call a physician immediately. Clean mouth with water.

**Most important symptoms and effects**

May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

**Self-Protection of the First Aider**

Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

**Notes to Physician**

Treat symptomatically.

**SECTION 5. FIRE-FIGHTING MEASURES****Suitable Extinguishing Media**

Water spray. Carbon dioxide (CO<sub>2</sub>). Dry chemical. Chemical foam.

**Extinguishing media which must not be used for safety reasons**

No information available.

**Specific Hazards Arising from the Chemical**

Thermal decomposition can lead to release of irritating gases and vapors.

**Protective Equipment and Precautions for Firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

**SECTION 6. ACCIDENTAL RELEASE MEASURES****Personal Precautions**

Ensure adequate ventilation.

**Environmental Precautions**

Do not flush into surface water or sanitary sewer system.

**Methods for Containment and Clean Up**

Avoid dust formation. Prevent product from entering drains. Sweep up and shovel into suitable containers for disposal. Do not flush into surface water or sanitary sewer system.

Refer to protective measures listed in Sections 8 and 13.

**SECTION 7. HANDLING AND STORAGE****Handling**

Do not breathe dust. Do not get in eyes, on skin, or on clothing. Handle product only in closed system or provide appropriate exhaust ventilation.

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**Storage**

Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

**Specific Use(s)**

Use in laboratories

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**
**Control Parameters**

Component	China	Taiwan	Thailand	Hong Kong
4,4'-Methylenedianiline	-	-	TWA: 0.1 ppm	-

Component	ACGIH TLV	OSHA PEL	NIOSH	The United Kingdom	European Union
4,4'-Methylenedianiline	TWA: 0.1 ppm Skin			STEL: 0.03 ppm 15 min STEL: 0.24 mg/m <sup>3</sup> 15 min TWA: 0.01 ppm 8 hr TWA: 0.08 mg/m <sup>3</sup> 8 hr Carc. Skin	TWA: 0.08 mg/m <sup>3</sup> (8h) Skin

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

**Monitoring methods**

BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

**Exposure Controls****Engineering Measures**

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

**Personal protective equipment**

**Eye Protection** Goggles (European standard - EN 166)

**Hand Protection** Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber	See manufacturers	-	EN 374	(minimum requirement)
Nitrile rubber	recommendations			
Neoprene				
PVC				

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.

(Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure

**Respiratory Protection** When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.  
To protect the wearer, respiratory protective equipment must be the correct fit and be used

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and maintained properly

**Large scale/emergency use** Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced  
**Recommended Filter type:** Particulates filter conforming to EN 143

**Small scale/Laboratory use** Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.  
**Recommended half mask:-** Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141  
When RPE is used a face piece Fit Test should be conducted

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

**Environmental exposure controls** Prevent product from entering drains. Do not allow material to contaminate ground water system.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<b>Appearance</b>	Beige	
<b>Physical State</b>	Solid	
<b>Odor</b>	Rotten-egg like	
<b>Odor Threshold</b>	No data available	
<b>pH</b>	9 - 10	(10 %); (Slurry)
<b>Melting Point/Range</b>	88 - 92 °C / 190.4 - 197.6 °F	
<b>Softening Point</b>	No data available	
<b>Boiling Point/Range</b>	398 - 399 °C / 748.4 - 750.2 °F	@ 768 mmHg
<b>Flash Point</b>	221 °C / 429.8 °F	<b>Method -</b> No information available
<b>Evaporation Rate</b>	Not applicable	Solid
<b>Flammability (solid,gas)</b>	No information available	
<b>Explosion Limits</b>	No data available	
<b>Vapor Pressure</b>	0.06 hPa @ 20 °C	
<b>Vapor Density</b>	Not applicable	Solid
<b>Specific Gravity / Density</b>	No data available 1.056 @ 100°C	
<b>Bulk Density</b>	No data available	
<b>Water Solubility</b>	Insoluble	
<b>Solubility in other solvents</b>	No information available	
<b>Partition Coefficient (n-octanol/water)</b>		
<b>Component</b>	<b>log Pow</b>	
4,4'-Methylenedianiline	1.55	
<b>Autoignition Temperature</b>	No data available	
<b>Decomposition Temperature</b>	270 °C	
<b>Viscosity</b>	Not applicable	Solid
<b>Explosive Properties</b>	No information available	
<b>Oxidizing Properties</b>	No information available	
<b>Molecular Formula</b>	C13 H14 N2	
<b>Molecular Weight</b>	198.27	

## SECTION 10. STABILITY AND REACTIVITY

**Stability** Stable under normal conditions.

**Hazardous Reactions** No information available.  
**Hazardous Polymerization** Hazardous polymerization does not occur.

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**Conditions to Avoid** Incompatible products.

**Materials to avoid** Strong oxidizing agents.

**Hazardous Decomposition Products** Nitrogen oxides (NOx). Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>).

### SECTION 11. TOXICOLOGICAL INFORMATION

**Product Information** No acute toxicity information is available for this product

**(a) acute toxicity;**

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
4,4'-Methylenedianiline	LD50 = 264 mg/kg ( Rat )	LD50 = 200 mg/kg ( Rabbit )	LC50 > 0.837 mg/L ( Rat ) 4 h

**(b) skin corrosion/irritation;** No data available

**(c) serious eye damage/irritation;** No data available

**(d) respiratory or skin sensitization;**

**Respiratory** No data available  
**Skin** Category 1

May cause sensitization by skin contact

**(e) germ cell mutagenicity;** Category 2

Ames test:; positive

**(f) carcinogenicity;** Category 1B

The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	EU	UK	Germany	IARC
4,4'-Methylenedianiline	Carc Cat. 1B		Cat. 2	Group 2B

**(g) reproductive toxicity;** No data available

**(h) STOT-single exposure;** Category 1

**Results / Target organs** Liver  
retina

**(i) STOT-repeated exposure;** Category 2

**Target Organs** Liver.

**(j) aspiration hazard;** Not applicable  
Solid

**Symptoms / effects, both acute and delayed** Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

### SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity effects** The product contains following substances which are hazardous for the environment. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

## 4,4'-Diaminodiphenylmethane

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
4,4'-Methylenedianiline	LC50: = 42 mg/L, 96h static (Brachydanio rerio)		EC50: = 21 mg/L, 72h (Desmodesmus subspicatus)	EC50 = 5.99 mg/L 5 min EC50 = 6.57 mg/L 15 min EC50 = 6.57 mg/L 30 min EC50 = 6.6 mg/L 1 h

**Persistence and Degradability**  
**Persistence**  
**Degradation in sewage treatment plant**

Expected to be biodegradable  
Persistence is unlikely.  
Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

**Bioaccumulative Potential** Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
4,4'-Methylenedianiline	1.55	3 - 14 dimensionless

**Mobility in soil** Spillage unlikely to penetrate soil Is not likely mobile in the environment due its low water solubility

**Endocrine Disruptor Information** This product does not contain any known or suspected endocrine disruptors  
**Persistent Organic Pollutant** This product does not contain any known or suspected substance  
**Ozone Depletion Potential** This product does not contain any known or suspected substance

## SECTION 13. DISPOSAL CONSIDERATIONS

**Waste from Residues/Unused Products** Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

**Contaminated Packaging** Dispose of this container to hazardous or special waste collection point.

**Other Information** Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not let this chemical enter the environment.

## SECTION 14. TRANSPORT INFORMATION

Road and Rail Transport

**UN-No** UN2651  
**Proper Shipping Name** 4,4`-DIAMINODIPHENYLMETHANE  
**Hazard Class** 6.1  
**Packing Group** III

IMDG/IMO

**UN-No** UN2651  
**Proper Shipping Name** 4,4`-DIAMINODIPHENYLMETHANE  
**Hazard Class** 6.1  
**Packing Group** III

IATA

**UN-No** UN2651  
**Proper Shipping Name** 4,4`-DIAMINODIPHENYLMETHANE  
**Hazard Class** 6.1

## 4,4'-Diaminodiphenylmethane

Packing Group III

Special Precautions for User No special precautions required

## SECTION 15. REGULATORY INFORMATION

## International Inventories

X = listed, China (IECSC), Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), Korea (KECL).

Component	The Inventory of Hazardous Chemicals (2015 Edition)	List of dangerous goods GB 12268 - 2012	TCSI	IECSC	EINECS	TSCA	DSL	PICCS	ENCS	ISHL	AICS	KECL
4,4'-Methylenedianiline	X	X	X	X	202-974-4	X	X	X	X	X	X	KE-23803

## National Regulations

Component	Toxic Chemical Substances Control Act
4,4'-Methylenedianiline 101-77-9 ( 97 )	Class IV (1 wt%)

## SECTION 16. OTHER INFORMATION

**Prepared By** Health, Safety and Environmental Department  
**Revision Date** 12-May-2024  
**Revision Summary** New emergency telephone response service provider.

## Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

Legend

**CAS** - Chemical Abstracts Service

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

**PICCS** - Philippines Inventory of Chemicals and Chemical Substances

**IECSC** - Chinese Inventory of Existing Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

**ENCS** - Japanese Existing and New Chemical Substances

**AICS** - Australian Inventory of Chemical Substances

**NZIoC** - New Zealand Inventory of Chemicals

**WEL** - Workplace Exposure Limit

**ACGIH** - American Conference of Governmental Industrial Hygienists

**DNEL** - Derived No Effect Level

**RPE** - Respiratory Protective Equipment

**LC50** - Lethal Concentration 50%

**NOEC** - No Observed Effect Concentration

**PBT** - Persistent, Bioaccumulative, Toxic

**TWA** - Time Weighted Average

**IARC** - International Agency for Research on Cancer

**PNEC** - Predicted No Effect Concentration

**LD50** - Lethal Dose 50%

**EC50** - Effective Concentration 50%

**POW** - Partition coefficient Octanol:Water

**vPvB** - very Persistent, very Bioaccumulative



**4,4'-Diaminodiphenylmethane**

**ICAO/IATA** - International Civil Aviation Organization/International Air Transport Association

**ADR** - European Agreement Concerning the International Carriage of Dangerous Goods by Road

**OECD** - Organisation for Economic Co-operation and Development

**BCF** - Bioconcentration factor

**IMO/IMDG** - International Maritime Organization/International Maritime Dangerous Goods Code

**MARPOL** - International Convention for the Prevention of Pollution from Ships

**ATE** - Acute Toxicity Estimate

**VOC** - (Volatile Organic Compound)

**Key literature references and sources for data**

<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

**Disclaimer**

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**End of Safety Data Sheet**